went into that little chip that you took out, and the property rights of the designer that put together the rest of the hardware?

MR. MC CRACKEN: The designer who put together the rest of the hardware can copyright his blueprints. He may be able to patent some of the devices. He is not ordinarily in the position of wanting to protect the expression of the ideas. I am not sure I am getting the subtleties.

MR. KEPLINGER: That is perhaps the second half of my question when I asked you how you get from the hardware chip to the program.

MR. MC CRACKEN: That is what I think we are getting at. Here is the read-only memory, the ROM, which represents information, if you will, as bridges of silicon inside this tiny device. If I want that, what I do is I go through the same process of writing the program, compiling it into an object code, and now I say, "Well, I want a thousand of these, and this is a bit expensive for that volume." So what I will do is manufacture this as a special purpose chip containing that particular program, that pattern of zeros and ones in a form that will stay there for centuries. To do this you have to have a

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ABSTRACT

Testimony on the copyrightability of computer software was heard at the 10th Commission meeting held at the New York Public Library in November 1976. This transcript of the meeting also includes reports of the Commission subcommittees on photocopying, software, networks, and data bases. (Author/AP)

# TRANSCRIPT CONTU MEETING # 10

## NATIONAL COMMISSION ON NEW TECHNOLOGICAL USES OF COPYRIGHTED WORKS

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| Software | Information storage and retrieval |
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TENTH MEETING OF THE COMMISSION ON :

NEW TECHNOLOGICAL USES OF COPYRIGHTED WORKS :

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New York Public Library
New York, New York

November 18, 1976
10:00 a.m.

B e f o r e :

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VICE-CHAIRMAN MELVILLE B. NIMMER
COMMISSIONER ALICE E. WILCOX
COMMISSIONER ARTHUR R. MILLER
COMMISSIONER DAN LACY
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DAVID PEYTON
MS. KEGAN

The Witness:

DANIEL D. McCRACKEN

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CHAIRMAN FULD: May I welcome all of you to the tenth meeting of our Commission and hope that this lovely room will add additional light on the problems and the concerns of our Commission.

Our first and only speaker, is Mr. Daniel McCracken. He is currently a self-employed consultant and has so been since 1959. Before that he was with General Electric for seven years. He is currently Vice President of the Association for Computing Machinery and Past Chairman of the Association's Committee on Computers and Public Policy.

He is a graduate of the Central Washington State University in mathematics and chemistry. In 1970 he graduated from Union Theological Seminary. He is the author of fifteen textbooks on computer programming and two general works on the social implications of computer technology.

Thank you for being here, Mr. McCracken.

MR. MC CRACKEN: Thank you, Judge Fuld. I do appreciate the opportunity to be here and to converse with you about something of great interest to all of us. I need to begin by underlining the disclaimer that is in the submission that is in front of each of you to the effect that I am speaking as an individual.

I am the Vice President of the ACM, but the ACM has never taken a position on software protection as a group, as a body, so I am not representing my constituents here.

I also have to underline very strongly that I am not representing any client, and there is an interesting coincidence there which I didn't know about until last Saturday which is that my major client right now, which is Intel Corporation, has also made a submission to this Commission, and I don't see any conflict of interest. I have discussed this with Mr. Keplinger. My consulting for Intel has nothing to do with software copyrights. It is entirely different. So I don't have the same problem.

I do want to use, however, with Intel's permission, some materials that I have received from them in the course of my work to try to make some of the issues we want to talk about a little more concrete. I hope that will not distress you. I am not a representative of Intel. When they read the transcript they may faint, for all I know. If that is agreeable, I will carry on.

You have been very generous in the allocation of time to me this morning. I would like to take a moment here and tell you what I have thought of doing in terms of the concerns that have been related to me,

and then see if there are other things that are of particular interest to you that we could do a little time rescheduling here. What I have in mind to do is go over with you very briefly certain aspects of three programs that are in front of you of Intel software products, copyrighted products, as it happens.

Not to try to teach you computer programming, and not to try to duplicate the presentations you have had in the past, but to make some of the terms perhaps a little more concrete, perhaps provide a little foundation for some things I want to say about what constitutes copying and what it is some of us at least are trying to protect in the software business. What we'll do in that little discussion, if you are agreeable, is start with a source program that ordinary people can read with moderate training, and go through the stages of that from there to something that machines can understand, but printed on paper, the various forms in which that can be stored for reading into a computer, and what happens to it once it gets inside the machine, and the distinction between hardware and software, the alleged distinction. I will talk about some of these issues that I understand are your concerns, and say a little bit about the variety

of ways in which pirates can rip off the producers of this kind of software.

In the submission that is in front of you, if you have a chance to browse through it at odd moments here, I have tried to list my biases. I won't pretend to have made a carefully reasoned argument that you should do it my way. Perhaps I am displaying my ignorance as much as anything, but you have some materials there that will indicate the point of view that I take.

May I stop and ask are there particular things that you want to be sure we talk about? Something else I gather that we will be doing is talk about the difference between an algorithm and a program. Things will come up in my presentation that you will want to ask about. All right, we will carry on.

I would suggest that you pick up the big document. This is the program for an Intel product, software product, called the Text Editor. Most of you are familiar with Text Editors in one form or another that lets you enter ordinary typing sort of text into a computer, correct your errors, move lines around, correct the spelling and all that sort of thing. And when you are done you can get a draft. The

secretary maybe can make corrections and that sort of thing. This is not a new idea. Text Editors have been around a good many years as the computer era goes. This is not a terribly sophisticated Text Editor. It is rather rudimentary, but it does the job. It is a very useful product.

What you are looking at is what a programmer produced when he or she sat down to write this program. This is called the source program. It is in the language called PL/M, which I suppose stands for something like programming language for micro processes, since this runs on a micro processor based computer.

PL/M is an example of a higher level language. Other languages are Fortran, Cobol, and many others; higher level in the sense that they are in an intermediate stage between the kinds of ways the people want to talk and the ways the computers want to talk. They are at a higher level than the instructions which the computers currently execute.

Now, a program consists of statements and explanatory text. In PL/M any string of characters that begins with the combination of a slash and asterisk, as you see in the very first line, and ends

with an asterisk and a slash is called a comment. This carries along on the listing, but it doesn't instruct the computer to do anything. So the first thirteen lines here are a comment, the first sixteen lines contain a copyright notice in source program form.

Most products that Intel is putting out, and indeed anybody else, contains the copyright notice in all versions of the program. We will see how that can be done rather simply.

The rest of this first page contains information about the way data is going to be stored in the computer for this program. The declarations, most of those have comments on them trying to explain to a human reader what is going on here. There are no page numbers on this particular listing, but you have line numbers throughout, and we can refer to things that way.

Let's flip ahead and just look at one example of what happens, what a program does. I want to go ahead to line 567, that is about ten pages in. The way this Text Editor works is that when you want to do something you type a single letter that constitutes a command to the Text Editor to do something. "I" means insert. "D" means delete. "K" means kill. "A"

means append. Most of the 26 letters have some meaning to this Text Editor. So when the editor is working on commands that it has received from the user, one function it has to perform is decide what command that is, and then take appropriate action.

If you look at 567 it says "DO CASE CHAR-A", CHAR stands for character. That is the letter we are now looking at, whatever it is. We subtract and that will be in a representation of some sort in binary. We would like to get from a letter to a number between zero and 25 because of the way this DO CASE statement works, according to the rules of what a "DO CASE" means and the syntax of this language. We would like to convert from a letter to a number between zero and 25. We can do that by subtracting the representation of the letter "A", put that in quotes and subtract it. And then the "DO CASE" says, if it is CASE N, pick up the body of the code and what follows, number N, if it is an "A", character minus A will be zero and we will do what follows immediately, everything that is shown on lines 569 through 606.

If what we were reading is "AB", the result is going to be to skip ahead to line 608 which does something much simpler. It says, "Let's now look

at the beginning of the text." CASE C is to move the pointer which says which character of the text we are looking at, right or left, and so on through the list.

COMMISSIONER DIX: It would help me if you told us just very briefly what the object of all this is? In other words, text editing, but text editing in what sense? Is this preparing copy for the printer? Is it cleaning up ungrammatical things? What is the purpose of this whole operation?

MR. MC CRACKEN: Any sort of an operation where you want to sit at a keyboard and come out with text such as John Hersey's latest novel, if he wants to do it this way, and he tells me he has done one that way, you can write programs this way. One very common use is to write programs using the Text Editor. What comes out in the end is perhaps a printed listing, perhaps it goes on to a disc storage device. Perhaps you punch a tape from it and ship it over to your friends in California, or whatever.

COMMISSIONER DIX: By editing then you mean the process of revising a string of words, inserting words, deleting words?

MR. MC CRACKEN: Yes. I really don't want to go over the program more than that. The rest

of the program is a description of what is to be done at various stages in the process of doing the kinds of things we have just said.

MR. LEVINE: This is all done by the human being?

MR. MC CRACKEN: Writing this source program is all done by a human being sitting in fact at a Text Editor. This program is written almost using itself. It sounds impossible, but in fact, that is almost what was done. This is a human product. It is the writing of an author.

I confess to a bias. I have a soft spot in my heart for copyrights. I can't deny it. This is a source program. A human being writes this. In most cases a computer cannot execute this directly. The kinds of things that a computer can do are much more elementary than the kinds of things that are represented by statements in such a language as this. The computer can do things like start that tape moving or add this number to what is over there or do something if what is in that register is negative; very, very simple things for the most part. That will change, believe me. But in this time frame what a computer does is very much simpler than this, so there has to

be a translation in this form, and what the computer can understand.

I use that word "translation" advisedly. It is used in the trade. I think it is a translation in your terms, too. But it is certainly used in the computer business; translate in this form to the machine's form. There are a couple of stages in the process, but let's just skip over the details and say that we go from a source program to an object program; the object program being something that the computer can understand.

Let's look ahead. If you look past the end of the source program, past line 346, you see a page that looks like this, clumps of numbers. What that tells us is that for each line that begins a statement of the source program, it tells you where in computer memory the corresponding machine instructions are going to begin. It says that line 33, the code for that begins in 23, the "H" means that the number system here is hexadecimal, which is a short way of representing binary numbers. Deep down in the heart of every digital computer everything really is going on in binary. Not very many people have to know that in some cases, but deep down it is all binary.

Yeses and noes are 1's and zeros. If we need to deal at this level, numbers get very long and we condense them.

COMMISSIONER NIMMER: You compared a translation of this sort to a translation as it is more generally understood and, of course, implying that since translations are copyrightable from English to French, when you translate from English to French, although you have started on the premise that you are going to put it in the French language, there still is great room for latitude as to how you are going to say a given phrase in French that is contained in English, if it can be said a number of ways and there is discretion involved.

Is that also true here, if you start with a given premise, you are going to put it in a given computer language? Is there still any discretion as to how you are going to say it?

MR. MC CRACKEN: Yes and no. Let me explain exactly what I mean. To get from the source language to the object code, the source program to the object program you have to do the translation, which in the case of this kind of language is called compilation. The thing that does it is a PROM compiler. Once a

compiler has been written and you submit this program in some suitable form to that compiler, you always get the same code. You had better always get the same code if everything is working right. If you don't, it is a machine error. But someone else writing the same compiler, writing the compiler for the same language, same machine, producing codes that would also do what you want, could very well come up with different instructions. In other words, there are good compilers and bad compilers. For extra effort you can get a compiler that puts out very short code, very fast code. A different compiler for the same language, same machine, could come up with different sequences of instructions.

COMMISSIONER NIMMER: The correction of a given compiler analogous to translating into French, is that a secondary stage?

MR. MC CRACKEN: It is more likely to determine which of two translators are going to do the translation for you. They are both competent and they will both come up in French. The words may be different and either one is a translation.

COMMISSIONER DIX: You say here on the notes that the conversion is almost always done by

the computer, itself. To come back to Professor Nimmer, is machine translation copyrightable?

COMMISSIONER NIMMER: I am not sure what you mean by machine translation.

COMMISSIONER DIX: There have been experiments for a long while to get a machine, there is a crude kind of translation possible by computer.

COMMISSIONER NIMMER: We don't know.

COMMISSIONER DIX: There is a direct parallel here. I suppose the question we will have to come up to is copyrightable by whom, also at some point.

COMMISSIONER NIMMER: If there is human input into it, then it is indirectly done by a human being and it is copyrightable.

MS. KEGAN: We did copyright some very early machine translations. I remember Lockheed couldn't be translated, so it always appeared in quotation marks. It was Russian into English.

COMMISSIONER NIMMER: When you say you translate, I assume you mean that the copyright office issued a registration?

MS. KEGAN: Registered it.

COMMISSIONER NIMMER: But that is only a sort of suggestion as to whether it is copyrightable.

We wouldn't know until a court has told us.

MS. KEGAN: That is true.

COMMISSIONER LACY: There are really two different questions here, whether the proprietor of the original program has an exclusive right to license somebody to translate it, and whether having translated it, the translation is a separately copyrightable work.

MR. MC CRACKEN: There is another issue here, and that is the compilation is done by a computer program which is, itself, copyrightable. It is not a practical matter that people would take the source program and by hand, without the aid of the machine, do the translation. It can be done, but that isn't the issue. It is not the practical problem.

Let's whip on through this. Let's look at the last page. What you have here is a representation of the actual machine instructions with a bit of help, a little bit of system supply. Deep down in the machine everything is binary. To conserve space you can represent that in some other number system like hexadecimal. It takes a fourth as many characters, or you can go a little step further.

Most machine instructions these days

consist of something called an operation code, and then some other stuff, some other things. Perhaps a number to be added, perhaps the address at which some data can be found or a lot of other possibilities. What this listing consists of is the operation code written not in hexadecimal, but in an English abbreviation. The very first thing you see there, the "MOV" stands for move from some place to somewhere else. You see things like "INX" which means increment register. "JMP" means jump out of the normal sequence of instruction and go somewhere else. "LXI" means to load a register with something. And there are something over a hundred different operation codes. This is an object program. This is a representative of it produced by a compiler which is another computer program. This is the thing that people allege is unreadable by human beings. That is not quite true.

If you just hand this to somebody and say, "What does it do?" they have got a bit of a problem. That is tough, it is a big job. On the other hand, if you say to somebody, "I think we have an infringement going on here. Here is some object code. I am of the impression that it is a text editor. Tell me what you can about it and come back in a week."

A person who knows this computer, who is an expert programmer, can look at this and tell you rather rapidly what it does, given that much of a hint; and given this and a source code, a source program which is alleged to be the source of this, can tell very quickly that the source program could have been what produced this object program.

The intellectual problem of saying, "Here are some binary digits, what do these things do if it is a program?" that is tough. That isn't the practical important situation, and it is not completely impossible, even at that. That is a printed representation of the program. The way this would get written actually, a program like this or a program to compute payrolls or keep track of rockets or whatever the computer is doing, could be written in fact by a person sitting at a console of some sort probably, using perhaps this thing. Perhaps he would write it on paper and it would be key-punched or whatever. It goes into a computer, is compiled, and you get a listing like this of the original source program. If you want it, you can look at the object program, and now you are ready to run.

Well, if you are still within the system

you can say, "Bring that program in from disc and let's execute it." If what you want to be able to do is give that program to somebody else or store it for your own use, then you will want to put it on some sort of external media. There are a number of such. Magnetic tape, that is not for use in this computer, but is used in most. Punch- cards, this happens to be a source program. We have an object program which would be rather unreadable. Here is a card from an object program, and the holes don't represent characters in the direct sense, that is hard to read.

COMMISSIONER KARPATKIN: What is the card from that source program?

MR. MC CRACKEN: They don't use cards or tape. This happens to be a program in an intermediate language called an assembly language for an IBM computer. It is an instruction written in a form that is more meaningful to a human being. A person with appropriate training can read a program written in this form.

MR. LEVINE: That was one of the issues when the copyright office first began to register claims in computer programs, whether a program merely on punch cards was in human readable form, and I think

they decided that while a person skilled in the art might be able to do it, they would not register it only in that form, they would require a printout to accompany the punch cards.

MR. MC CRACKEN: That is outside of my bailiwick, so to speak. As long as we can establish the principle that the one is the translation of the other, they are in effect the same thing.

COMMISSIONER NIMMER: Under new law that wouldn't be a problem.

MR. MC CRACKEN: That is right. The tangible representation phrase seems to me to cover that. The way INTEL supplies their programs these days is either as a paper tape, like so; as a matter of fact, here is the tape for the Text Editor. This is what it takes; punched across this thing is a representation of each character of the object code. You put this in and it reads it. This is copyrighted. It is copyrighted by a physical label on the outside of the thing and in machine readable form on here you will find the copyright notice. We cover all the bases. We don't know what the courts are going to do with this.

This is kind of important. This

illustrates one of the issues. It is very, very simple to copy this stuff. Put it in a paper tape reader and at a hundred characters a second you make another copy. Programs like this, to do useful things, are being sold by pirates, at fees for the cost of the tape. The computer clubs, hobbyists will get together and a tape of this size is probably a buck and a half which is the cost of the tape and the reproduction, and nobody gets paid anything for writing the program.

COMMISSIONER PERLE: What does Intel sell it for?

MR. MC CRACKEN: I don't know. In this particular case I want to come to that issue in terms of the compiler, but a lot more than that. This one they may give away, for all I know. It is a question of whether it is bundled or unbundled. I don't happen to know whether they sell the Text Editor or not.

MR. LEVINE: Do the owners of the rights, whatever they may be, feel that the reproduction by these hobbyists is in some way interfering with their ability to market their programs.

MR. MC CRACKEN: I don't know that Intel

is being hurt so far by the hobbyists. I can't say for sure. I don't represent them. But pick another example from that area; a couple of guys about two years ago wrote a translator for another language called BASIC, which is something like PL/1 in a certain sense, to translate from that language into the computer's language. It took them, I don't know, a year, two years, something like that, and they wanted to sell the product. I guess they sold about two. From then on it was rip off time. Everybody that wanted a copy of that compiler said, "Make me one" to whomever he could find that had one. The guy said, "No way are we going to do that again. Why should we? We have wasted our lives and didn't get paid at all." They weren't asking much, forty, fifty dollars.

That is one form in which programs can be stolen. They can be stolen in this form, too. If you have just the source listing, punch it up, compile it. Another way programs can be represented is on a magnetic disc sort of thing. You have here a jacket and inside a magnetic material that rotates and you can read things off of it. It is called a floppy disc in the trade. This will hold about a

quarter of a million characters. What I am holding in fact are two discs that contain a couple of dozen programs, individual programs that comprise the Intel operating system for a certain computer they make. In fact, the Text Editor that we have been talking about is on both of these discs. When you want to use the Text Editor, what you actually do is slip this in a reader, push the right kind of buttons and it says, "Okay, what do you want to do?" And away you go. These things are also very easy to copy. Blank discs can be bought for six bucks and you can copy one for four bucks. For ten dollars a pirate can have a copy of programs that may have cost a million, two million dollars. I haven't asked Intel what their total cost in developing these things were, but it would probably be in some such range, say a million bucks. Copy it for ten dollars and sell it for twenty dollars and you have a going business and Intel is selling these things for a thousand dollars.

MR. LEVINE: If I put any one of these into a computer and ask for a printout, which one of these three --

MR. MC CRACKEN: You will get the object program. What you will get along with this, along with

a copyright notice, I might add, is hexadecimal digits essentially representing the binary form of the program. And if that is all you have got with no hints as to what is going on, you have a problem understanding it. But please understand, people, that you don't have to understand this thing to use it. You can rip it off and do a lot of good work with it. You don't have to have the faintest idea of how it works.

If you want to do a text editing job, you don't have to understand this stuff. You sit down and type, get an instruction sheet that tells you how, and it works. You don't have to understand how it works. This is the direct translation of this copyrighted program. In fact, I couldn't tell you exactly what it does by looking at this with the aid of a device. I don't think that cuts any ice at all. As long as you can prove infringement, if necessary, that is a different issue.

MR. LEVINE: I may be confused, and if I am on this question, please unconfuse me, if you can. But if you go from the object code, in order to go from the object code to the source code you need another computer program.

MR. MC CRACKEN: Did you say what you

meant, to go from the object to the source?

MR. LEVINE: Source to object. You need another computer program.

MR. MC CRACKEN: That is right.

MR. LEVINE: And let's say that "X" is the copyright owner of this, and "Y" is the copyright owner of the other computer program that works on this to produce the object code, who is the copyright owner of the object code?

MR. MC CRACKEN: That is a major issue. You have a program in source code that is the work of an author, the writing of an author. It is readable by a human being with appropriate training. It is then mechanically translated into another form, English to French, if you will, and what people steal is the latter, the most common.

COMMISSIONER PERLE: I think that may be the analogy. See if I am right on this: the source code is something which is written by a person who may have proprietary rights in it, and that is translated by another program which was written by somebody, and what is the object code is produced and is actually something which was written by a computer. So that the object code here is a machine created thing in the last

analysis, right?

MR. LEVINE: I think that seems to be.

COMMISSIONER PERLE: It lumps together all of our questions really.

CHAIRMAN FULD: It means the intermediary would be human.

MR. MC CRACKEN: Who is the author of the translation of Moby Dick, the translator?

COMMISSIONER NIMMER You have what is called a derivative work. The translation is derived from the underlying work. The translation in French is derived from the underlying work in English. If somebody copies/French/ the version, they have infringed two copyrights. They have infringed the translator's copyrights work in the translation, and also the underlying work even though they haven't looked at the underlying work.

MR. MC CRACKEN: Exactly. That is the analogy we protectors want. The translation, the object code, is a mechanical, simply mechanical, derivation of something that human beings put a great deal of intellectual effort into.

COMMISSIONER NIMMER: That assumes Mr. Perle's point, although it is machine made it can be

copyrightable.

COMMISSIONER PERLE: I think what is wanted here is compensation for use rather than for copying.

MR. MC CRACKEN. We want both.

COMMISSIONER PERLE: The guy who sat down and wrote the code for the compiler, that compiler is not being copied, it is being used.

MR. MC CRACKEN: Let's talk about the forms of misappropriation.

COMMISSIONER LACY: I think we are being led down a path by saying translation here, because I suspect that isn't really what we have got. Given any specific compiler code you have a one to one transformation.

MR. MC CRACKEN: That is true.

COMMISSIONER LACY: I think the analogy is putting a motion picture film on the video tape in order to make it useable in different types of equipment. It is a different format of the same literary work. It is not a new literary work. And the difference in format is just to accommodate itself to the different machine. You would use a compiler program to achieve that transformation just as you may

use a patented piece of equipment to transform a film into video tape.

COMMISSIONER MILLER: Let us test that. When the writer of the source program sits down I take it he or she is writing a program with some notion as to the machine it is going to be used on.

MR. MC CRACKEN: Often, but not always. One of the trends in this business is to write programs that will be run on any machine.

COMMISSIONER MILLER: You have a source program. It is then to be converted into an object program. The object program, is that constrained in terms of the machine?

MR. MC CRACKEN: Well --

COMMISSIONER MILLER: Suppose somebody writes a program in the source language without regard to any particular machine. As a practical matter do people translate that into object programs without reference to a machine?

MR. MC CRACKEN: No, but they may translate it into programs for a half dozen machines.

COMMISSIONER MILLER: The translation program for a particular machine, to what degree is that automatic? If you have a translation program

for a machine how many variations on that translation program for that machine are either feasible or likely?

MR. MC CRACKEN: Many. Let me clarify what you have said. For each combination of source language and computer there has to be a compiler to go from that source language to object programs for that machine. With that understood then, there can be many compilers written by different people.

COMMISSIONER MILLER: Then it is not analogous to the video tape to the motion picture. The video tape to the motion picture will produce an absolute identical product.

MR. MC CRACKEN: Lower quality. It may be 460 lines here and 525 in Europe.

COMMISSIONER MILLER: The pictures are not going to change, the information content is not going to change. What comes out at the end is a different format of what was put in at the beginning, and that will be true no matter which video translation machine you put it through.

COMMISSIONER NIMMER: Is the information content changed here?

MR. MC CRACKEN: Let me pick up on that analogy. If you translate from a motion picture

film to a video tape in this country it will have a certain number of lines vertically and a certain quality as a result. The same job done on a different video tape machine in Europe is going to have more lines and higher quality. In a certain sense, it is the same picture, and in another sense it isn't.

COMMISSIONER MILLER: If I hear you correctly, I write a source program. I say to myself there are thirty people out there with a particular machine. I would like as my market to license my source program thirty different times to thirty different people with thirty machines, each of which may have a different compiler.

MR. MC CRACKEN: It is possible.

COMMISSIONER MILLER: Therefore, the object program that will come out of each of those thirty compilers may look different, not in terms of the intensity of the black marks on the piece of paper as struck by a teletype, but literally alphanumerically different.

MR. MC CRACKEN: Absolutely. There are two PL/M compilers now. One of them sits on this disc and runs on a certain machine. Another one is written in another language altogether and runs on any machine.

What comes out of that latter may be very different.

COMMISSIONER MILLER: My conclusion is that the analogy is not the video tape translator.

MR. MC CRACKEN: I leave the lawyer talk to you. It seems to me that this is a descendant of the same intellectual work as this.

CHAIRMAN FULD: It seems exceedingly unrealistic, the entire discussion.

MR. MC CRACKEN: It is a bit meta-physical.

CHAIRMAN FULD: Unrealistic. The translation from the English to the French would seem to be protected by the copyright that was given to the English.

MR. MC CRACKEN: From the programmer's standpoint, from the software standpoint, they write a program which ends up represented in a variety of different ways. As far as they are concerned it is the same product. And it can be ripped off at any stage to their harm. At which stage it is ripped off isn't of much importance to the ripper. He can get the value either way, whether he takes this, photocopies it, keypunches it or he takes this, he doesn't care. He can steal it either way.

CHAIRMAN FULD: It is unrealistic.

MR. MC CRACKEN: May I go on to make things even more complicated. Let's look at one other program. I think it is the second one. It says "Intellec/MDS Monitor". This is a program that does some things at a lower level. It does some things down in its innards. Everybody that uses this particular machine must have this. This particular program is written in a different language. It is called assembly language and it is down at the level of individual instructions, and that takes a translator to translate from assembly language into the machine's actual instructions. That translator is the third program.

The thing called the Macro Assembler is another program that makes that translation. All of these are available either in disc or another form. They monitor, something that everyone that uses this computer must have, he has to have it there when he first pushes the button; it is a "get me started". It has to be there before you know how to load anything else, so it can't very well come off a tape. It has to be sitting there all the time.

The way they do that is to put it into

a semi-conductor memory, a permanent form of semi-conductor memory, a read only memory. This thing here is called the monitor board from the computer we are talking about. What you are looking at, the black things that you can see are packages of semi-conductor devices each containing some hundreds of transistors that do elementary electronic functions represented to the way this computer is put together.

This would all be called hardware in ordinary terminology. They are connected together by copper wires. They have been painted green. They look like copper. But all the lines on here are wired. There is solder on here. This is visible equipment. You can kick it, it is hardware in that sense.

The monitor program which is a program in chips, its machine instructions expressed in zeros and ones, sits in this little chip here. That is called a read-only memory. It stores sixteen thousand binary digits in this package, like so. The storage consists of silicon bridges, solid metallic, semi-metallic connections within the circuitry in that package. That is solid hardware. You call that hardware, right? Well, not quite, because I can take it out. There is the program.

Now, for the convenience of the manufacturer, sometimes for cost reasons, sometimes for speed reasons, and other situations, it suits their purposes to put the program, to represent the program in the form of solid little teensy pieces of silicon inside this package, rather than in this form or this form, or the other kinds of ways it could be represented.

I submit that for the purposes of protecting intellectual property there isn't any significant difference between a program expressed this way as ink on paper, this way as pieces of silicon. In a certain sense it is the same program. Now, if it makes you feel any better, if there is some distinction here that says, well, this is different because you can pull it out, fine, I will solder it in. It is a little less convenient for me as a manufacturer, but if you think that makes some difference, I can put that in solder the way all the rest of these chips are. Does that really change anything? You say to yourself, well, this is different somehow because it is solid. If you want to replace things you have to spend eleven hundred dollars for a new mask, and it costs you a bunch of money to go out into the

field and try all these chips out.

There is another way to do it. If you don't like this way, I will give you another kind of chip, also removable. It also stores programs. Well, more or less in the same fashion. The way information is stored in this chip is not in the form of solid hunks of silicon, but I believe in the form of storage of electrons in very tiny capacitors. Never mind the details; stored in another form such that it will stay there for years and years and years, much longer than the expected lifetime of the product into which it goes. So it is permanent storage in that sense, and yet this thing has a quartz lid on it, so that if you want to reuse this thing, if you would like to erase what is on this thing, you put it under an ultra-violet light source for about fifteen minutes and it all disappears.

What I am trying to say is the technology is changing, and what you should focus on is the notion of alternative representations of essentially the same information. Whether you represent an object program as the kind of things I showed you, or this way or this way or solid solder in connections here, it is all the fruits of somebody's intellectual labor

represented in the form of different physical phenomena.

COMMISSIONER HERSEY: There is one significant difference. At this stage you said that a trained person could read it. At that stage no one can read it except the machine.

MR. MC CRACKEN: That is not entirely true. Let's talk first about how people steal things. One way they steal things is they get this sort of chip, take the lid off, peel it off a layer at a time and simply make photographs of the chip and remanufacture it without benefit of paying a half million dollars for the development of the chip.

Another way to steal is to take this chip, put it in a machine that you can buy for a few hundred dollars, put a blank chip in another socket on the same machine and copy it into something like this which takes a matter of seconds, and you have now stolen the originator's work and can make lots of copies in a very short period of time.

If you hand me a chip like this and say, "Well, for all I know that could be a program. Tell me what it does." As I say, that is a difficult intellectual challenge, but not entirely impossible. The first thing you would do, you would either put

this chip in a machine that can read what it contains and make a printed listing of it, and that would be hexadecimal, that would show exactly in human readable form what the information is at the bit level.

MR. KEPLINGER: Just as you would do with the disc or the tape?

MR. MC CRACKEN: Yes. I can do with this just as readily as I can find out what is in this in terms of what the zeros and ones are. If I assume this is in a program and would like to get some clues as to what it does, I can use another program called disassembly, the opposite of assembly. It goes from the object code to what the program guesses might have been an original assembly language program. It interprets anything it can as an operation code. It comes up with the listing. It won't have meaningful data names. It won't be good. It surely wouldn't be the same thing as the source program, but it will give you a lot of clues.

A trained person now sits down and says, "I wonder if I can figure out what it does." If he is smart and has a couple of hints such as, "I think somebody stole this from me and it is probably so and so," he can make a rather good determination of what

the program does. It is difficult, but in a practical enforcement situation where people would be willing to spend the effort to find out whatever they could, it is not impossible.

COMMISSIONER NIMMER: May I say that that issue, whether it is readable to the naked eye or to the man learned in the art, or what have you, may not be really the relevant one. Lawyers tend to feel more comfortable with analogies of the past. There is an analogy here, go back to the Apollo case in 1908. The issue before the court was as to a piano roll, the perforations, a copy of the music that was embodied in the piano roll. The Supreme Court at that time said, "No, it is not a copy. It is just a part of the instrument for playing the music because it is not visually perceptible."

Then under the 1909 Act that was partially changed and we have video tape, for example, which is apparently copyrightable although it is not perceptible to the naked eye, under the new Act clearly that is not an impediment, the fact that it is not visually perceptible as long as it can be understood by putting it in a machine.

So that the original concept that it is

only part of a machine really has been discarded. That doesn't mean we are necessarily bound to that and should adopt that. But it seems to me this is an example of something that in a sense is a part of a machine, but on the other hand contains something that is copyrighted.

The mere fact that it is part of a machine should not preclude its copyrightability. But then we get back to the fundamental question, do we think that computer programs should be copyrightable? If we do, then for my own part, at least tentatively, I don't think it should make a difference the physical form that it takes.

MR. MC CRACKEN: I don't either. I think if you believe this human writing is copyrightable, then you have to admit this is copyrightable, too. It is another representation of the same expression of an idea.

MR. KEPLINGER: Could I ask for a brief clarification. You identified that you have two kinds of chips. One is what is called a PROM, the one that can be erased and rewritten. The other kind of chip you identified I believe is a special purpose circuit chip that embodies in hardware the

equivalent of the program.

MR. MC CRACKEN: That is right.

MR. KEPLINGER: How do you get from the human writing to each of those? What are the intermediate steps?

MR. MC CRACKEN: That is good. That is worthwhile. Let's take the "program" Read-only memory" first, the kind that you can erase with the ultraviolet, there are some variations on this. Suppose I have written a program that I want to get into this form, and then I take a collection of equipment. I have most of it on loan from Intel and myself, most of it is not expensive. Having gone from this stage to object code, having satisfied myself, spending many hours and dollars getting that program correct, I say I want it in this form. I put a blank one in a little machine and say, "Do it." I push the right buttons.

MR. KEPLINGER: Just as you would with a tape or a disc?

MR. MC CRACKEN: Exactly. I put a blank one of these things in and I say, "Make a copy of the program that is in memory." Just as I would put some blank paper tape in and say, "Make a copy of

a program."

COMMISSIONER PERLE: And that is another program that activates the machine?

MR. MC CRACKEN: Programs are involved in all of these. Programs are scattered all over these machines that most people don't know about.

CHAIRMAN FULD: How long does that last?

MR. MC CRACKEN: Ten, twenty years.

CHAIRMAN FULD: The content of the program is how long?

MR. MC CRACKEN: Once you have written the program in it will stay there for decades.

CHAIRMAN FULD: The duration of it would be how long, half hour, an hour?

MR. LEVINE: How long would it take to convert?

MR. MC CRACKEN: Three seconds. It will then last for thirty years, unless you erase it by putting it under an ultraviolet light source, and in another three seconds put in something else.

COMMISSIONER WILCOX: This may be a naive question, but what is the distinction in the property rights for protecting the property of what

set of photographic masks that define the patterns of metal inside of this thing. Those masks are this big when they are first drawn and they are photo-reproduced to a tenth of an inch of what is inside here. The drawing of these masks is a repetitive time-consuming job if done by human beings, and nobody does it this way. Instead, you activate another program which says, "Draw those masks." A computer-controlled drafting device draws the pictures. It takes a few hours, maybe many hours. I don't know too much about that. You put those masks then in front of the process and carry on with the chip-making process.

COMMISSIONER WILCOX: Isn't that how the hardware is done, too?

MR. MC CRACKEN: Yes, indeed, in principle, for certain kinds of things. Let me show you another board. Here is a board that contains the random access memory part of it for this machine where you can read something into these gadgets and it will stay there as long as the power is on essentially. This goes away when you are done with this job. You can regain it then in like a millionth of a second. You see some very regular sorts of patterns in the interconnection here. The layout of these printed circuit boards is

also a fine computer application. It is not quite as automatic as drawing masks. But you are right, it will become more and more automatic.

COMMISSIONER WILCOX: My question is what is the major distinction in protecting the property rights of it because both of them involve a great deal of human effort, human originality?

MR. MC CRACKEN: You will have to make some allowances for my biases and inexperience in copyright matters and that sort of thing. My bias, my experience is in the software area. I would choose to answer that by emphasizing the writings of an author, that a program is the expression of an idea in a written form that has close parallels, as far as I am concerned, to writing novels and textbooks.

What the appropriate protection is for the hardware designer is something I simply haven't thought much about.

COMMISSIONER MILLER: The source of the copyright, both in terms of developing the chip mask, and in terms of developing the machine method for producing those circuit boards, the copyrightable element you would say is in the program that tells the machine to produce the mask?

MR. MC CRACKEN: Let me say that some programs in my view ought not to be patentable. That is a separate issue.

COMMISSIONER MILLER: The program that tells the machine to produce the mask is like one of these source programs?

MR. MC CRACKEN: Yes, and that ought to be copyrightable.

COMMISSIONER MILLER: How many different ways are there to produce a program that will sufficiently instruct machines to produce a mask?

MR. MC CRACKEN: An infinite number in principle, and in practice dozens, hundreds.

COMMISSIONER MILLER: So it is like the theoretical infinite capacity of writing Hamlet, the plot and embellishments.

MR. MC CRACKEN: I believe so. It is not really true that there is a very restrictive way to write a program and therefore it is not copyrightable. I don't believe that at all.

COMMISSIONER MILLER: When you say "infinite", we assume that along that scale there are increases and decreases in the efficiency with which the machine will operate?

MR. MC CRACKEN: Perhaps.

COMMISSIONER MILLER: Better and poorer ways?

MR. MC CRACKEN: Yes, probably.

COMMISSIONER MILLER: In all of the programs that we have been talking about this morning, with particular reference to these compiler programs, does it continue to be true that there are an infinite number of ways of writing particular programs to do particular jobs?

MR. MC CRACKEN: Yes. In principle, infinite, and in practice, dozens, hundreds. There are many hundreds of compilers/ ways of going from Fortran to some machine. There are perhaps dozens of going from Fortran to one particular machine called the IBM 360, 370 machine; some of them are better, worse, better in one way, worse in another; different in ways that don't matter, but literally dozens for that one particular pair, and there will be dozens and dozens more.

COMMISSIONER MILLER: In your judgment there is no reason in establishing policy for the copyrightability of computer programs, but distinguishing between or among programs, all programs are created

equal in your judgment from a copyright perspective?

MR. MC CRACKEN: I do believe that.

COMMISSIONER MILLER: It is your judgment that by recognizing copyright protection, and we get to talking about the thickness of that protection, the power of that protection, there shouldn't be any blockage in the ability of others to come along and achieve the same result with different programs?

MR. MC CRACKEN: Absolutely.

COMMISSIONER MILLER: Within tolerable limits of efficiency --

MR. MC CRACKEN: Yes.

COMMISSIONER PERLE: That is inconsistent with your statement before that some programs should be patentable, because the patent would protect the idea, itself.

MR. MC CRACKEN: Yes, but very few programs are ever going to be patentable under current patent policies.

COMMISSIONER PERLE: What do you see as the distinction between that which should be patentable and not?

MR. MC CRACKEN: Novelty. Nothing we have talked about here is novel at this stage or has

been for the last twenty years. I am kind of glad that programs were not widely patented right at the beginning of the era. That could have been harmful to the growth of a very rapidly changing industry. But under the most optimistic conditions that a pro-patenting person can imagine, I don't think that a tiny fraction of the programs will ever be patentable.

If a program were patentable I should think that there would then be many probable expressions of the idea contained in that program, each of those expressions copyrightable under license from the patent holder.

COMMISSIONER PERLE: No way.

MR. MC CRACKEN: But I am out of my field.

COMMISSIONER PERLE: You have to make up your mind as to whether it is going to be copyrighted or not.

MR. MC CRACKEN: I should just bow out of this discussion, not being a lawyer. But let me just insist that so few programs will ever be patentable, that in the copyright context this is almost a red herring. The people who want copyright protection now have no interest in patents. Nothing we have talked

about here is patentable, nothing novel about it.

COMMISSIONER PERLE: You have been talking about copyright protection. Do you mean copyright protection or protection?

MR. MC CRACKEN: I mean protection, really.

COMMISSIONER PERLE: By some means, it really doesn't matter to you whether it is copyrightable or something else.

MR. MC CRACKEN: Yes, that is true, against copying by any means that are now known or may be devised, whatever the right language would be, such as photocopying the original, punching a deck of cards, copying one of those tapes, sticking a chip in the machine and the duplicating, all of the above, and also unauthorized use of the program.

One of the rip-off mechanisms, a current abuse that people need relief from is that a group of users will get together, they have the equipment, they have the computer hardware, and they will say, "Well, I don't have to make this one up. PL/M happens to be a fairly new language, and the availability of it on one of these discs has been less than a month now." The users will say, "Well, a thousand bucks, I don't

know whether I like PL/M or not, but I would like to try it." They say, "Hey, Joe, why don't you pay a thousand bucks. You keep it on Monday and Tuesday, and I will use it the rest of the week." It is illegal under the terms of the sale. You would lose a thousand bucks that way, assuming the other guy would have bought it. That is a rip-off, too.

MR. LEVINE: Don't they have contract remedies?

MR. MC CRACKEN: Sure they do. Maybe that is all they need, but what they are relying on is copyright, and they are hoping the copyright will stand up in court. That is their protection.

COMMISSIONER NIMMER: We have been furnished with a copy of a British study, a questionnaire sent out to program creators, and so on. As I read it, one of the points involved is that apparently, at least in Britain, people are not deterred from the making of programs, creating of them, by the lack of copyright protection. Obviously they like it. But there isn't a deterrent. It does not effect the creation. You suggested one example that seems to go the other way, but would you generalize on that issue here.

MR. MC CRACKEN: I can only give you an unqualified opinion based on talking to a very few people that the people in this country in the software houses and manufacturers who are producing unbundled software that they want to sell separately, do feel that they are inhibited by the widespread practice of theft of their products, and that whatever the growth rate of the software industry has been, it could have been greater. That as the copying becomes widespread, it will be a real problem, but I have now said everything I know. I can't go further than that.

MR. LEVINE: Can I shift just a little bit. The programs we have been talking about today are huge programs that fit into what used to be huge computers, which I guess are now small computers. But are computer programs in some form or another going to be purchaseable in your local five and dime store for ten and twenty dollars? And if so, what form is that going to take? I know about computer games, and they are essentially computer programs. Could you shift to that because I think we have been thinking in terms of sales between giants.

MR. MC CRACKEN: Well, the micro

processor goes very much to the heart of that. This chip here is a complete central processing unit of a computer. This board alone will do more than the first machine I worked on. That trend is going on very rapidly. Intel is about to market a chip that puts almost everything that is on this board onto one chip. It has storage on the chip. That is going on very rapidly.

Somebody has predicted in another ten, twenty years the equivalent of the largest machines now running will be on a machine like this. I heard a talk from a guy from the telephone company last night who said that it won't be long, a few years before most every handset will have a computer in it of the general power of what we are looking at here. There are going to be three micro computers in every car in a few years. All of those things have programs. Most of them are completely invisible to the user. But we can see in the hobbyist activity a pretty good hint that you will be buying programs in the five and dime. There are stores opening up all over the country, computer stores, where you can go in and buy these chips with or without programs in them. It is a burgeoning hobby activity.

MR. LEVINE: I am thinking of something that we heard about such as the Dyna Book -- are you familiar with the Xerox Dyna Book. I can't describe it, but in the future presumably that is going to be purchasable in your local book store.

MR. MC CRACKEN: What is it?

MR. LEVINE: You will essentially be carrying around your own store of information which will be immediately available to you through the Dyna Book.. This is going to be a consumer item. The question is what is the effect of protecting software going to be on the marketing practices of things of that sort?

MR. MC CRACKEN: I think it could be very profound. Developing a program that works costs a lot of money. The current estimate of the productivity of a programmer these days is one statement of source code per hour. With the complete life of developing a program product, it is just an immense amount of labor that goes in. The idea of a program is just about worthless until it has been expressed in a checked out computer code. It can cost a very large amount of money to produce something which can then sell for rather small figures in a mass market.

COMMISSIONER MILLER: Could I now circle you back. When we were talking about protection, you listed the example of Chinese copying and use. But given the cost of production of one of these major programs, do you or don't you think that it is necessary to protect against not the literal photocopyist, but the person who sits down either with the source or the object listing, studies it and says, "Aha, I see how this person with these people invested a million dollars and came up with ideas 1 through N, and now I am going to go out and produce my own program to achieve the same result with some twist or wiggles and bumps and valleys, but basically having gotten all the intellectual juice out of that million dollar investment.

MR. MC CRACKEN: I would very much like to respond to that. That is an important question. As you may have detected by now, I am a bit of a moralist and I don't like thievery, and I would prefer protection against that, too, but in practice that is not really a very big problem, because that second guy has a lot of work to do. He is almost going to deserve what he gets. If you will permit me to tell a very short story. Moss Hart in his auto-

biography, "Act One", told about the stupidest thing he ever heard anybody saying about writing a play. He ran into a young playwright at a cocktail party who was known to be working on a play and asked him how it was going. He said, "Well, I am almost done. All I have to do now is dialogue it." He said it was the stupidest thing ever because the dialogue is the essence of the play. Until you have done that you do not have a play. You have the idea of a play.

John Hersey said here before, it is an unusual author that can get along on an outline. Some people can, but not very many. If you have the idea of a program, even some very clever idea, you still have a long, long way to go before that is a running reliable product. The original coding, writing the source codes down on sheets of paper, or whatever, is no more than ten or twenty percent of the total cost of writing a program. The rest of it is in designing, how it is going to work and the checking it out, establishing that it works, getting the errors out. So that second guy, picking this up and saying, "I see how a compiler works," or something, in the first place he has a lot of work to do just to understand it, and then he sits down and writes his own, he may spend

nearly as much as the original.

Compilers aren't new. In a sense everybody does them. Somebody else sits down to write another compiler from scratch, having read the source code from this, he would still spend about the same amount of money.

COMMISSIONER NIMMER: In focusing on trying to find what is the idea of the program which is unprotected, if we look at conventional copy records the expression may be short of the literal Chinese copy. Take a motion picture based upon a novel, it would be ridiculous to say that because you have motion picture rights on the novel that the work is done. But nevertheless, the one who makes a motion picture based upon a novel without the consent of the novelist is infringing the novel, because you are taking more than the idea. The mere fact that additional work is needed is not necessarily the answer if we look at conventional copyright principles. Maybe in this context we should think that the protection only goes to the literal protection.

MR. MC CRACKEN: There would have to be some distinctions drawn. Somebody who reads a program and says he knows how to do that and write a

new thing independently, that probably ought to be legal, otherwise you have protected the idea. On the other hand, somebody who takes the program and says, "Here is line 24 and it says 'work space, memory'. Well, I am going to call that work area," and he changes all the names and shuffles some order around where it doesn't matter and puts in some things to look different, he has some work to do, but that is probably infringement. There needs to be some distinctions drawn.

What I am saying is, if you were to find that defining what constitutes infringement of somebody making a fresh copy from the source program to be too difficult to define in this changing technology and all that, you could ignore it; that is not in fact where the abuses are these days.

COMMISSIONER HERSEY: Are you saying that the producers don't want to protect the idea?

MR. MC CRACKEN: The producers have got enough sense not to claim that if they want copyrights. If somebody has invented a really new way to do something in the computer business he ought to be applying for a patent.

Do you want to talk about algorithms for

a minute? I have read some discussions in these circles and elsewhere that leave me with the impression that an algorithm is viewed as a sort of a platonic ideal. Let me give you an algorithm. The task is to find the square root of a number, and you want some procedure for doing that. What an algorithm is is the sequence of steps, the processing operations, if you will. The steps have to be meaningful to the agent who is going to carry out the algorithm. If the agent is a computer it has got to be in a language that meets the syntax requirements, et cetera. It may be fairly restricted as to how you write. If it is an algorithm that is going to be carried out by a human being to find the list of the best lawyers, whatever, the instructions can be different. It is a sequence of steps. You know where to begin. After you have done each step you know what to do next, and you have some way to know when you are done. That is what an algorithm is.

Suppose we are trying to do a square root. I will give you an example of something that sounds like a solution but which is not an algorithm. It says you have the number "N", and you want the square root of it. Do the following: you have another

column "X", and set that equal to zero, that is step one. Step two is square X. Step three is compare X squared and N. If they are the same thing, then stop. X is the square root of N. Step four, add one to X. Step five, go back to step two. That sounds like an algorithm, it tells you what to do at each stage. It is all very precise. I can write that down and you can do it. That is an algorithm, if it works. It may be a very bad one because if N is negative it will go on forever; if N is not a perfect square you are dead.

People have found other ways to find square roots. It is very slow. If you want square roots of a million it will find it, but it will test all numbers from zero to a thousand, so it is very bad. There is another method, something called the Newton-Raveson Method. It says you want the square root of a number N. Step one, if N is negative, stop. There is no square root. Two, set X equal to 1. Three, compute A through X which is equal to one and a half of N over X plus X. Next step, if X and X new are the same to within point zero zero one, stop. X new is the best approximation that you can get. Next step, set X equal to X new. Next step, go back

to step two. That works for any positive number at all subject to a couple of little provisos that don't matter for our purpose, and you can find the square root rather quickly.

In this context what is the algorithm? Well, it is a set of steps. Unless you want to protect ideas in people's heads, you have got to write it down, communicate it to somebody else, publish a book, you have to write it down. Here you could write down the words I just gave you, read the transcript, and that is an algorithm for the Newton-Raveson Method of finding the square root. It happens not to be understandable to any computer that I know of. If you want a computer to execute it you will have to express it in a programming language, in which case it can do it in PL/M or Fortran, and/or any other language. That would be the expression of an algorithm as a computer program. That program, itself, would be an algorithm, an expression of the algorithm, just as the English language I gave you to begin with is an expression of the algorithm.

My own organization published something called Collected Algorithms from the Communications of ACM. Those algorithms are computer programs.

Distinctions that try to work on some difference between this ideal core of the idea as distinguished from its mere expression are on rocky ground. It is a hard distinction to make.

COMMISSIONER NIMMER: If you look upon the distinction of idea and expression, I may write, "Boy meets girl. Boy falls in love with girl," that is written in a sense, and that is an expression in a sense. But in a copyright sense it is such an abstract idea that that would be regarded as too abstract to be protectable. It would have to be more specific to cross over the idea of the expression line.

Taking that kind of distinction can you speak of algorithms which are less abstract and more specific, and others that are more abstract?

MR. MC CRACKEN: Well, there are computing techniques. For instance, in converting a source program into an object program you are given a long string of characters. The program has to decide what they mean. Is this a number or is it an address? Is this an operation code or is it something else? Is this a comment? There are algorithms for figuring out what a string of characters

means as a program which are embodied in all compilers. Somebody invented those methods at a university somewhere in most cases, and they published it and they have now become the basis of hundreds of different compilers. I suppose that what people really mean when they try to talk about the distinction between the program and the algorithm that underlies it is based on expressing that algorithm in a form that is easily understood by people.

If I tell you how to look at this line of things in here and decide whether that is a comment or not in the PL/M sense, I can describe it to you and you will say, "Okay, I see what that is about," and that somehow is considered to be an algorithm; whereas the program that does it is something more mechanical somehow. But in the way the algorithm is used, that is not a good distinction.

COMMISSIONER PERLE: Is an algorithm a simple program?

MR. MC CRACKEN: Some algorithms are extremely complex.

COMMISSIONER PERLE: Is an algorithm something which is so basic to the computer that it should not be protected?

MR. MC CRACKEN: No, I don't believe that. I think if nobody had invented the Newton-Raveson Method that might very well be patentable.

COMMISSIONER PERLE: Univac came up with a proposal which says that mere algorithms are not protectable. How do you feel about that?

MR. MC CRACKEN: Do they mean copyright protection?

COMMISSIONER PERLE: Whatever protection.

MR. MC CRACKEN: I wouldn't go that far. I say very few programs and very few algorithms would be patentable. There are certainly some, there is something called the Simplex Method which is a way of solving huge systems describing economic ways to run gas refineries, or schedule machine shops, or very big complex systems of any quality. A fellow named George Dantzig figured out a way to do that job in a fairly efficient way by hand. It is called the Simplex Method. It is ingenious, certainly novel at the time. I think that the Simplex algorithm should have been patentable or protectable in some way or another, whether written down as a computer program or not. That was an intellectual invention. It is novel, useful and more obvious. I wouldn't begin to be

able to agree that a mere algorithm shouldn't be protectable.

COMMISSIONER PERLE: Let's stick to copyrights. Should a mere algorithm not be protectable under the copyright concepts? Univac came to that conclusion, and in the things you had said before it sounds to me as though Univac came to the wrong conclusion.

MR. MC CRACKEN: Well, in the majority of cases I guess I agree, but in a few cases I do not. In the cases of really non-intellectual inventions --

COMMISSIONER PERLE: I am talking about copyright now, the idea. In effect, what Univac was trying to say is something which are ideas --

MR. KEPLINGER: I think what they are trying to say is that in some cases there will be virtual identity in a program and in a "mere algorithm"; in that case giving copyright protection to the program would in effect be giving protection to the underlying idea because any other implementation would be an equivalent.

MR. MC CRACKEN: I understand that.

MR. KEPLINGER: That is my understanding, that the distinction would provide for the kind of

interchange of ideas, and the flow of information that is essential to the continued growth and development of the art.

CHAIRMAN FULD: That seems to me to be a good point at which to recess unless there are other questions or comment.

MR. LEVINE: Just a couple of quick things. First, Mr. Mc Cracken I believe will be here the rest of the afternoon so that if questions come up during our discussion, he will be available.

We have run into some conflicts on the meetings that we have scheduled in December, January, and February. If possible I would like to change some of those dates. It looks now as though it will be virtually impossible to meet in December, and the January meeting was scheduled for inauguration day. Can we move the January meeting up to January 13th and 14th?

CHAIRMAN FULD: Where will it be?

MR. LEVINE: The January meeting will be in Washington. The February 24th, 25th meeting will conflict with a copyright program that several of us will be at.

CHAIRMAN FULD: Move the February

meeting to February 17th and 18th rather than the 24th and 25th. Where will that be?

MR. LEVINE: We haven't figured that out yet. I will send out information and ask you to comment, and if some cannot make it, we will have to reschedule that.

CHAIRMAN FULD: March 31st and April 1st will remain as the meeting after that. Do you know where that will be?

MR. LEVINE: No. One of the meetings, I believe, will probably be in Boston. The February or March meeting will probably be in Boston.

CHAIRMAN FULD: We will recess now until two-thirty.

(Whereupon a luncheon recess was taken until two-thirty p.m.)

AFTERNOON SESSION

CHAIRMAN FULD: May I call to order our afternoon session. May I impose upon you, Mr. McCracken, to take the chair again, please.

Mr. Levine, did you want to say something first about the future schedule?

MR. LEVINE: I was asked at the end of the morning hour if we could reschedule the February meeting for February 24th and 25th since people had already made plans since the copyright meeting was going to be in New York anyhow, and I hope that no one over lunch hour committed February 24th and 25th to something other than CONTU.

CHAIRMAN FULD: That is New York.

MR. LEVINE: I believe that will be in New York, February 24th and 25th.

CHAIRMAN FULD: How did you want to begin this afternoon's session?

MR. LEVINE: One of the things that we have asked Mr. McCracken to speak to us about was the future of programming, and I think we probably didn't have an opportunity to get to it this morning. At

our luncheon meeting we thought it might be helpful if we could address ourselves to it, if we could address where Mr. McCracken thinks smaller computer programs embodiments are going to and what forms they may take.

CHAIRMAN FULD: Physically you are talking about?

MR. LEVINE: I mean in every sense, not only physically. But again, my question this morning is one that I am particularly interested in, and that is will computer programs in one form or another be a consumer item, a direct one to one consumer item?

MR. MC CRACKEN: Let me pick up on that. I think probably not. In terms of the consumer realizing that he is dealing with a program, having any consciousness that there is a program or having to change it, that sort of thing, we are going in the opposite direction from that. We are asking computers more and more to deal with the consumer on his terms. Airlines reservations, the consumer there in a sense is the reservation agent, and he or she is not dealing with programmer languages like this at all. If you want to think of that interaction, it is a language designed to be congenial to the human being. Back of that are huge, huge complex programs that are written in this

form. That agent has no dealing with that in such terms. And that is sort of one way to look at the kind of trends that are going on.

The higher level languages are getting higher and higher, getting more and more abstract. The machine languages are getting higher and higher. You understand that the distinction between the two, where you draw the line between what source program capabilities are, what kinds of things you can say and what the level of the machine instructions is, is pretty much economic.

If somebody wanted to build a machine that would accept PL/M as a machine language, do it today, he would store the compiler and chips and call that a machine language. MIT is installing a language called LISP directly.

COMMISSIONER PERLE: What do you mean by directly?

MR. MC CRACKEN: You write a program in that language, punch on cards or whatever, type it into a keyboard device like any other program, and you say, "Go." What gets presented to the hardware of the machine is those symbols, kinds of symbols that we were looking at this morning, the high level

abstraction kind of directions to carry out processing, and the machine does it.

Now down beneath that level there are lots of other levels, something called microprograms. where that is what is called the machine language level of adding two numbers and that sort of stuff.

Another level below that that the programmer can't get at, where even more elementary things are being built up, but since the program can't change the way those more elementary things are combined, we call that micro code and call the higher thing the instruction level. You can draw that kind of level wherever it is economically feasible.

As the hardware gets cheaper and cheaper and smaller and smaller, what the machine can do at its own level is become more and more complex and more and more abstract.

CHAIRMAN FULD: At greater expense?

MR. MC CRACKEN: Lesser expense. Presumably what will happen actually, about the same expense as the cost performance ratio of the hardware drops, people will have the choice of either doing the same things for less money or spending the same money and getting more functions. You should understand that all

the languages we have talked about so far are what are called procedural languages where you say, "Do this, do that, do the next thing, make a test, go back if necessary," that sort of thing, one step at a time, at some level of abstraction or another.

There is another class of language called problem oriented languages where you say to the machine, "Well, I've gotthis problem. Could you solve it? How would you suggest going about it? If you know a way, just do it." You will present the data on a system of some design problem in electrical engineering, and perhaps the computer system will prompt you. It will say, "What would you like to do today?" "I want to solve a network having this many nodes and this kind of circuit element." It will say, "Okay, draw a picture," and elicit this kind of information from you and say, "Here is how it would work," and present your data without your having said anything at all as to how to solve network equations, any more than the passenger agent talks to the reservation system in terms of discount services.

You say, "I want to go to Toledo," and they say that you can't, "We are booked up." In between these two things there may have been thousands

of operations inside the equipment. Often there is some city the agent doesn't even know about. Programming is going through that sort of phase.

Twenty years ago there weren't any higher level languages. They were just emerging and people wrote at the level of the machine. Machine instructions were more rudimentary on the average than what we do now. This trend will go on. More and more things that are now done by a single program in the main computer will be scattered off in pieces. Things that people now do to control secondary storage, the disc storage and tapes which will now have to be programmed as part of the operating system, will be distributed out to the devices that are storing things. There will be little computers scattered all over the machine. Like I say, in every telephone handset, three in every car, doing things people won't even know about, all controlled by programs. Most of these programs will be stored as some form of read-only memory.

CHAIRMAN FULD: Does one manufacturer know what the others are about or is this all kept confidential?

MR. MC CRACKEN: They are amazingly

well informed on the average. After a certain stage, during the research stage they manage to keep their secrets. But once things get into production they buy each other's chips and find out what is going on instantly.

Most of the high production items, the microcomputers and the storage devices and that sort of thing, a second source, which means that somebody else made it, designed and licensed it, there is a lot of movement of personnel, perhaps employment agreements are not always followed to the letter of the law and they seem to be pretty well informed. I am not saying that IBM has spies at Univac and vice versa at all, but among the areas where some of the most recent research is going on in chip manufacturing a lot of them are going on in one place, California.

CHAIRMAN FULD: Does this render useless things that have been done in the past? Are they ready for the scrap heap?

MR. MC CRACKEN: Well, the rate of change is very rapid. I don't know that that is the result of good intelligence systems. I don't quite follow you on that.

CHAIRMAN FULD: What is happening to

all of the hardware that has been produced?

MR. MC CRACKEN: Well, there comes a point where it is uneconomical to continue operating old hardware because you can replace it for less than the operating cost.

CHAIRMAN FULD: What happens to the machines that have been built?

MR. MC CRACKEN: Discarded, given to universities, whatever.

CHAIRMAN FULD: Or to the Smithsonian?

MR. MC CRACKEN: I wish the Smithsonian had more of that. Some of the oldest equipment is being junked.

COMMISSIONER PERLE: Can you give us some more hint about what is going to happen in the future. You told us that language is getting more sophisticated and abstract. Do you know the line, the next fifty or one hundred years, if people can see that far, what is going to happen to this technology that we are dealing with? Remembering that our charge is dealing with all of this exotic stuff and that we want to come up with recommendations that are going to be good for more than tomorrow, what can you tell us about the future and what differences

there will be in this whole business of information?

MR. MC CRACKEN: Well, I certainly cannot see fifty years. I might be able to see ten and with a little luck twenty. Things are changing so rapidly it is awkward to make predictions, to go too far out. There are some other things you can say though. The spread of computer applications continues with more and more things being done with computers at both ends and in the middle. That is to say, in the area of the very, very large machine connected together by telephone networks, a great deal of that going on. Programming required to make those networks operate correctly is very complex and expensive. The machines are getting bigger and faster at that end of the scale. At the same time they are getting smaller and faster and cheaper at the lower end.

In terms of the pervasiveness of computers throughout the consumer world it is the teensy ones, it is the chips that do everything that an early computer would do for ten or twenty dollars that has people excited. The fact that there are both ends of the scale and that there are big huge manufacturers and a great many users and all in the same computer world leads to some contrary trends in

programming. At one end of the programming world you have the programming task becoming more like an engineering discipline, people learning to plan it and draw blueprints, so to speak, and plan in advance for the testing, people checking each other's work before it is ever compiled.

A lot of things are being learned these days about how to write better programs; better in the sense of being easier to maintain since big programs always change; better in the sense of having fewer errors when they are first tried; better in the sense of being flexible, easy for people to understand, that sort of thing. There is a lot going on in this area that is making programming more disciplined and more effective.

At the other end of the scale you have these micro processors on the chip going out by the barrel all over the world and being programmed by people who have very little training. Their expertise is in some other area and they have taken a course or two and now they are writing programs for microcomputers that will go into consumer devices or things impacting consumers all over the landscape. For example, controlling the gates on our subway system,

the passenger toll taking thing, there will be computers in all of those. There will be computers in all sorts of factory applications, keeping track of things going on. Instead of a big computer with lines going out to all of these places, the computer will be spread at each point. You can buy the Noran Navigation System for picking out where the fish were last week 200 miles off the coast to about fifty feet with a computer, one of these little ones. The word-processing business, the automation of the secretarial functioning, you can buy.

COMMISSIONER KARPATKIN: What will come into people's homes through their telephones or TV sets?

MR. MC CRACKEN: That is an area where opinions differ. Some people think that cable television which has a very much broader band, we could be bringing in far more than fifteen channels, will lead to things like interactive terminals in the home. If someone wants to know when Charlemagne was born, they will dial it up. There will be access to huge bodies of data with perhaps the television being the output device. It is hard to say whether the economics and the cultural factors will really work out

that way.

People talk about why commute, why couldn't everybody just work at home and have individual terminals and access to the data banks and all of that? Some of us say, "I like to be with other people. I don't want to sit in a room and interact only over telephone lines." It is a little hard to say how the combination of economics and cultural factors will go.

COMMISSIONER DIX: I can visualize a program that will figure out your income tax to be redone every year and sold in ten cent stores, a little packet, some sort of a cartridge that would contain the program that you can slip into a standard minicomputer at home. This would be geared to the new form 1040 every year. If that kind of thing came along, this is what I am interested in, the programming, which would be very elementary, I guess, would be done by the manufacturer by a workman working for hire, presumably, and the protection of that would come along with the protection of the patent on the idea, maybe. I was just wondering how that fitted into the copyright thing.

MR. MC CRACKEN: The copyright on the

program that does it, I should think.

COMMISSIONER PERLE: Whatever we recommend or the Congress enacts.

COMMISSIONER DIX: I can see a lot of that kind of thing from what you are saying being at least possible and it might even sell.

MR. MC CRACKEN: It is possible, and people will try it.

What I was getting at, to finish up with one thought, there are so many new applications coming along that they can't conceivably all be done by experienced programmers and they are instead being done by amateurs who took a course a couple of months ago. Now they are going to control the subways. They are doing some amazing things, and they have not learned all the lessons. They seem to insist on making all the same mistakes over again.

COMMISSIONER DIX: You recommend we ride a bus for a while?

MR. MC CRACKEN: I use that as a hypothetical example, of course.

COMMISSIONER PERLE: Those are th changes, the applications of the type of computers. Do you see any changes in the way programs are written

or that which embodies programs, the technologies applicable to the sets of instructions that are given to these systems?

MR. MC CRACKEN: Well, you can describe something as general as how programming is done under such headings as the language used. I am saying these are becoming more and more abstract. You can talk about such things as programming becoming more of a group effort, people checking each other's work rather than regarding it as a highly creative act which nobody should be allowed to see.

COMMISSIONER PERLE: Would that be automated? We started off with this which was a human function. Somebody sat down and wrote it. Will there come a point where this first step is different somehow?

MR. MC CRACKEN: I am trying to say that there is a progression going on, has been since the earliest days where more and more of the routine human things are taken over by computer systems.

Twenty years ago it wasn't possible to write in this sort of language because there weren't compilers. This way of programming had just been invented. Twenty years from now we probably won't

be dealing with things on the average of this level of detail. We will be able to give a command which has a higher level. It is hard to come up with examples. Things haven't been invented yet. But it will say, "Design a network to do this," and out will come a circuit. And the person who said, "Design the network," will regard that as his instruction to a computer. That will be a program. That will be a part of some bigger operation. Down underneath that there are other things that are doing calculations and taking square roots and that sort of thing. But to him the programming language is in terms of such things as design a network.

COMMISSIONER PERLE: You ask the computer to design a network and out pops a network. Who is the author of that network?

MR. MC CRACKEN: I am. If I write this sort of thing and out pops a chip --

COMMISSIONER PERLE: All you did was ask a question.

MR. LEVINE: Or is it the person who wrote the computer program that acted on your instructions to that computer?

MR. MC CRACKEN: If I write a program

in PL/M to solve a payroll, I can copyright that, I hope, and the guy who wrote the PL/M compiler which is also a program can copyright that, and already has. You will always have both of those things going on. Anything that a person does with a computer from here on out will involve other computer programs which are also copyrightable, I trust.

COMMISSIONER PERLE: You have asked a question of a machine.

MR. MC CRACKEN: I have given it an instruction. I said, "Do something for me." That is a programming step.

COMMISSIONER PERLE: And that machine in turn is going to draw from all sorts of resources that are there available.

MR. MC CRACKEN: That is right.

COMMISSIONER PERLE: Some which may be proprietary and some which may not.

MR. MC CRACKEN: Yes.

COMMISSIONER PERLE: Our job here is to figure out should that machine arrange for payment along those resources as drawn? And when it comes back in compliance with your instructions with a product, do we have to worry about the allocation

of proprietary rights or compensation for further use on those resources that were drawn upon, or can we rely just upon your instruction?

MR. KEPLINGER: Can I offer a concrete example in something that may be done today.

MR. MC CRACKEN: Yes.

MR. KEPLINGER: If I have written a program that produces computer graphics and it is available on someone's time sharing system and I sit down at a terminal and I call up this program and I enter equations for producing it, and I tell the program to rotate that through vectors, and it does this and it comes out with a computer graphic, who has authorized the computer graphic, who has produced it?

COMMISSIONER NIMMER: I am not sure that example made it clearer to me.

MR. MC CRACKEN: Let me suggest another example. That gets into the question of computer generated works. I am not sure I am competent on that at all. Suppose an engineer at Ford uses a program that does some sort of design automation function that comes up with a shock absorber characteristic. If that program to do that design job is proprietary and Ford bought it from somebody, then it

is between Ford and the supplier as to what sort of obligations Ford has to pay for it, whether it is a license that lets him use it indefinitely or royalty or whatever. Eventually out comes a car. Now the users of the car don't have to go backwards through this change and pay the proprietor. I think that is kind of the assumption that was involved in part of your question.

COMMISSIONER PERLE: No. I assume that when you instruct the machine of some sort to design something for you, you in turn have an application, you want to do something. I want to know who owns the rights to this? Who is the author of it? Who controls the right? Author is a good word.

Who controls the right to do with that end product, that network, you say, that circuitry? It is printed out, the circuitry on the back of your program for it, and it has utilized five different programs to get there, all of which are from different people. You give the instructions saying that this is what I want it to end up with. How do you arrange the rights of the people involved?

MR. MC CRACKEN: Somebody leases me a program and I agree to pay him for the use of it on

some mutually agreeable terms. He doesn't then have any control over what sorts of things I design with it.

COMMISSIONER LACY: I don't think that is our problem any more than when you make a movie that is involving a copyright on a novel, that is involved in copyright on the music, that is involved in the performance of actors. The producer has contracted for all of these things. He bargains that out with the people involved.

COMMISSIONER PERLE: I think what we end up with then is that perhaps there is a payment involved to the proprietor of one of the programs that is drawn upon for the use of that program, and he is out of the picture.

COMMISSIONER LACY: He may or may not be out of the picture. He may get a percentage of the action, just as it is not the business of the copyright office of the Congress to decide when you make a movie what sort of terms you make with the composer of some of the music in it, who in turn has incorporated by arrangement some music of a third party or music of a fourth party.

MR. MC CRACKEN: The copyright office doesn't tell John Wiley and Sons what they can or must

pay me as royalties.

COMMISSIONER NIMMER: Isn't it a question if there is no contractual arrangement, no royalty or other license, whose rights are being infringed by the final word? I guess it would be your position that the program creator of this program that is being used could claim an infringement or should be able to claim an infringement in the resulting work, not ownership of the resulting work, but the resulting work infringes his work.

MR. MC CRACKEN: Well, yes. Maybe this gets into the question of what some of us want in the way of protection, the protection against copying in all of these multitude of ways, but also unauthorized use. I don't want a person to be able to borrow a copy of the program from someone else and use it to do something that I regard as an infringement of my rights.

If I have produced a software package I can try to negotiate a contract which says that the user has to pay me a royalty each time he runs it. I don't think there has been much of that yet, but that wouldn't be your concern either, would it?

COMMISSIONER PERLE: My concern is

whether there is the right in the programmer to demand such a thing. The only way he gets the right is if the use is something by law which he is entitled to payment for.

MR. MC CRACKEN: If I go to a publisher with a book proposal I can either make a deal whether they will pay me a fixed sum if I choose to, or they can pay me so much per copy. That isn't the law's business, is it?

COMMISSIONER PERLE: It is the law which initially says that the proprietor of the copyright has to give a license to the publisher for the publisher to copy.

MR. MC CRACKEN: I am out of my field.

COMMISSIONER WILCOX: When you push the analogy of the program being analogous to an author and his written work, when you buy a book you have the right to --

MR. MC CRACKEN: You have the right to read it.

COMMISSIONER WILCOX: And you have the right as an owner of that book to loan it to somebody and for them to read it.

COMMISSIONER NIMMER: Not in Scandanavia.

COMMISSIONER WILCOX: We go here.

MR. MC CRACKEN: Let's pursue that analogy. If I have written a program and copyrighted it, I am willing to have anybody read it that wants to. I am not willing to have it loaned, if I have sold them the right to use it as the machine reader will perform, I am not willing to have them loan it to some of their buddies and run it on a computer to do things with something that I would be able to sell.

The analogy of human reading may involve some sort of fair use doctrine for computer programs which says, for instance, that you can at least load them into the computer to see what they are. If you have a disc and it is not labeled and you want to put it in the machine to see what is on this thing, that should surely not be an infringement, just to display its contents, to find out what it is, to try to understand whether you want to use it, that sort of thing.

COMMISSIONER NIMMER: Commissioner Wilcox points out two things: one, should copyright attach to a computer program? And if so, what are the particular bundle of rights that should be

comprised in that copyright? The analogy to books, there may be an analogy to books in the sense that both should be copyrightable, but the rights that the copyright owner may claim in a book perhaps may not be appropriate for the rights that are claimed in a computer program.

MR. MC CRACKEN: The comparison between programs and books may be rather tenuous. One of the things that is different is that this process of continuous translation, a source program to object program to chips or whatever, is inherent in the thing in a way that it isn't in books. It is also different, the copying is very, very simple. You can copy a computer program, relatively speaking, a lot cheaper than you can copy a book actually, in terms of the harm being done to the originator.

I am uncomfortable with personally trying to find enough about copyright precedents to make sure that that is the right way to protect programs. I leave all that to you lawyers and simply say, "Look, there is an intellectual property here being ripped off. Please stop it somehow." I assess the political situation and it might be simpler to do that in terms of the copyright provision

than in some new form of protection.

MR. LEVINE: I think this question you may know the answer to. The term of copyright protection under the copyright revision bill will be approximately 75 or 100 years which I think we all recognize is well beyond virtually all computer programs. What do you think the useful life of a computer program is and do you guess that will become shorter in the future?

CHAIRMAN FULD: Does it depend on the subject matter?

MR. MC CRACKEN: Well, somewhat. I think somewhere in the five to ten to fifteen years it would cover the vast majority of programs. At the present time techniques and methods are changing so rapidly that almost all programs would be obsolete in some such time scale. Plus the fact that most big programs at least, the program, itself, changes on a month to month basis as improvements are made, errors are corrected, new capabilities are added, so that in the course of ten years the thing has been transformed to the point where it is really very, very different, and where new registrations or whatever would have been made in the intervening period

anyway.

So that fifty years is surely completely unnecessary at this point. It is hard to imagine how long it would be in the future before programs would be stable that long. It is very hard to imagine. If anything, the period where protection would be necessary is shortened. Programming is not getting easier very fast, and we don't see big breakthroughs in that area, but it is getting a little bit more efficient. And as it does people don't lay off programmers and do the same work with fewer people, they hire more programmers and try to turn out a lot more products.

CHAIRMAN FULD: Are there any more queries and comments?

COMMISSIONER PERLE: If we were to decide that something like copyright protection should apply to computer programmings, and we have this variety of ways which emobdy the program, somebody is going to have some device where you either deposit or otherwise establish what it is that he is getting rights to. Can you give us any good answer as to what the best means of registration of deposits would be of this set of instructions from going from this piece of paper to your chip?

MR. MC CRACKEN: I will really have to beg off on that. That is clearly outside my competence. I honestly really fully don't understand what the purposes of registration are.

COMMISSIONER PERLE: The purpose of registration basically is clearly to establish that in which the proprietor claims rights, the form that best describes to the world that to which he is claiming proprietorship.

MR. MC CRACKEN: On the face of it it seems to me that this thing that does that best is the thing that is closest to human readability and that is the source program. That is not where the rip-off most commonly occurs. That best describes to a human reader what it is that is being protected.

COMMISSIONER PERLE: If you deposited the chip that wouldn't do a bit of good to anybody; is that right?

MR. MC CRACKEN: That is not quite true, because someone who has the appropriate equipment could stick that chip in it and find out what is there; they routinely do that.

COMMISSIONER LACY: If you follow the existing principles of the law, wouldn't it be the case

that (A) you wouldn't have to deposit unless you publish? There is no requirement in the old or new law to deposit an unpublished work. (B) If you do have to deposit, what you are asked to deposit would be in addition to what you published and in the best form of it. What form do you offer for sale? The chip is what you offer for sale. The tape is what you offer for sale. The card, that is what you are going to have to deposit with what it is you publish unless you change the law. We could recommend a change.

COMMISSIONER PERLE: I am not sure that does it because one of the catches in this, as I understand it, is that going from that chip, which is what is sold, back to this, is very difficult. So that I can rip off this source program and end up with -- no, I can start with the chip, but I can't work back to this source program either.

MR. MC CRACKEN: You don't need to.

COMMISSIONER PERLE: So that depositing the source program wouldn't do a bit of good if the chip was ripped off.

MR. LEVINE: If you put the chip in and you run out the program from the chip you end up with which of these three?

MR. MC CRACKEN: The one at the end, the machine language.

COMMISSIONER PERLE: Will you always get the same readout from the same chip, or could you put the chip in different machines for different readouts?

MR. MC CRACKEN: At the level of the binary information that is in the chip it will always be the same. Someone trying to go backwards to the source code and deduce what the source code might have been, he won't come back with this. A possible defense of an accused printer would be to say, "Well, yes, this is the same exact chip as yours, but the way I got my chip was that I wrote a different program and it compiled into the same object code." Theoretically possible, but extremely unlikely.

COMMISSIONER NIMMER: But that goes to the point of registration and deposit where a copyright differs from patent. Patent you register, deposit, in order to let the world know what you claim a monopoly on and no one else may do it regardless of whether they independently arrived at it or not. In copyright that is not the case. The point of deposit, as I see it, is so that at the time of the infringe-

ment action, if the defendant says the plaintiff did not have that kind of thing, he is now making it up as if it was like mine, but it really wasn't like mine and now he, after the fact, is copying me instead of me copying him, by having the thing on deposit at an earlier time there is some evidence that the plaintiff did have it first in time. That doesn't itself establish whether the defendant copied or independently came up with it, but it eliminates the argument that the plaintiff copied from the defendant instead of the other way around.

So it seems to me that it really is not too important what the form is as long as one can see from whatever is deposited, see what it is the plaintiff had at a given point in time.

MR. MC CRACKEN: It would seem to me it makes sense to deposit the source program in whatever form which it is most commonly sold.

COMMISSIONER LACY: The Library of Congress has a good deal of discretion in this. They used to require that motion pictures be deposited in the form of paper prints of motion pictures. That was totally unusable.

MR. LEVINE: Under the revision bill the

register is going to have discretion as to what to accept for deposit. If she starts getting in for deposit huge computer programs she will say, "We don't need all that," and it will not be deposited anyway, I am sure.

CHAIRMAN FULD: Unless there are any other queries or comments, thank you very much, Mr. McCracken. You have been very illuminating and helpful.

The next item on the agenda, the discussion of public policy implication and copyright status of computer programs and data bases. I suppose that has been covered essentially, or is there more to be said on that?

MR. LEVINE: I think there is more that we will be producing for the Commission on that as we understand more about the way computer programs are going to be marketed in the future. One of the points that the memo makes is that the cost of the computer program frequently is so far at this point from the individual consumer that by the time it reaches the individual consumer the cost of the program, itself, becomes a negligible item in the charge to the consumer, airline reservations, hotel reservations are some of

the examples I would give, and health services, that type of thing.

But if in fact programs become a consumer item such as phonograph records,

then the ability to control copying is right at the consumer level and will affect the price at the consumer level. I think this is one of the things we have been asked to look at. I ask for any comments, discussion that you may have.

COMMISSIONER LACY: I would not discuss it at length because it really is no more applicable to software and data bases than it is to other aspects of copyright. But there are a couple of assumptions in the paper on policy that I think could lead us down wrong paths. One is an assumption that copyright is a restriction imposed on dissemination in order to encourage creativity, and there is a balance between this. I think we all recognize that copyright is to encourage dissemination, and not to restrict it. Copyright under the laws of Western societies, as the printing press and other means of large scale dissemination became possible, was really to encourage it.

The other is somehow the assumption that the First Amendment and the copyright and patent clause of the Constitution are in warfare with each other, and that the copyright clause was put into the Constitution to make it possible to grant monopolies that otherwise would be unconstitutional. That is not the case. The reason it was put into the Constitution had only to do with state versus Federal relationships. Almost every state had a copyright act at that time. This was simply intended not to be an exception in aiding a monopoly attitude, but to be a grant to the power of the Federal authority. I think the assumption that you very often find that otherwise the Federal Government couldn't grant an exclusive use of this, the point is that otherwise the Federal Government couldn't do it as distinguished from the state, and that is why it is in there. This whole feeling that somehow it is a restrictive and monopolistic provision tolerated only because of its creativity is wrong.

COMMISSIONER HERSEY: One other point that the policy paper raises I think leads to suggest something that we need to know, and that is the point that any judgment we make about what protection would be appropriate has implicit in it a judgment about

whether the producers are getting an adequate return on their capital investment. I don't think we have enough evidence now to judge that issue.

The material we have had has given a few hints about the growth of programming on data base producers, but how much damage was done by losses through the piracy and stealing of material, has this really been an inhibiting factor in the growth of these companies. We have had several examples given us of the kind of thievery that can take place, but the SRI material that was given us suggested that of 470 cases that they have reviewed there have been no copyright cases. There had been breaking and entering, bombing, invasion of privacy and all sorts of other crimes for which there seem to be adequate recourses in law, and for us to judge whether there should be new kinds of protection or whether copyright should be extended seems to me to depend a little bit on the real economics of this kind of thievery as it has taken place in the past, and such as we can judge as to its potential in the future.

I don't think we have had enough of the economics of this sort of loss to make the judgment we need to make.

MR. LEVINE: Mike, correct me if you think I am wrong in this, but we have not been able to find people that say that they are in fact suffering economic loss as a result of being ripped off, their data base being ripped off.

COMMISSIONER HERSEY: That is the point of my query.

COMMISSIONER LACY: I don't think you would have any trouble finding that. I can produce for you some very grave losses. I think the problem is that their losses are probably not because of errors or weaknesses in the copyright law, just as you can find lots of people who have been mugged or ripped off on the streets of New York, but not because of weakness in our laws against mugging or ripping off.

There is a very serious unwillingness to invest large sums of money in new developments.

COMMISSIONER HERSEY: We haven't had that adopted and I would like to see it.

COMMISSIONER LACY: You may find some reluctance to do it because these would involve proprietary plans for making substantial investments which they may be queasy about. They might not want the competitors to know what their plans were.

CHAIRMAN FULD: Why do we have to know that?

COMMISSIONER HERSEY: Whether the actual losses are in excess of the kinds of losses that would be normal risks of competition, would be risks from losses by other sorts of crime, the issue whether there should be new sorts of protection and what sort of protection would depend, as the policy paper said, on how these losses would affect the industry. Presumably the purpose of this protection is to encourage creation. My question is whether the creation of these things has been discouraged.

CHAIRMAN FULD: Do you think that is so, whether there has been discouragement even though these things happen?

COMMISSIONER HERSEY: I wonder.

COMMISSIONER NIMMER: That puts it in different focus. Before you said evidence of rip-offs. The real issue is has there been inhibition of creation of new programs by virtue of rip-offs?

COMMISSIONER LACY: Not really. Inhibition of dissemination as well as creation. For example, almost everybody by relying on trade secrecy and restrictive and limited leasing has avoided wide-

spread dissemination because they would lose control of the property. That is a very real factor.

COMMISSIONER PERLE: Without exception everybody who testified about data bases and programming said that protection is required.

COMMISSIONER HERSEY: Of course they want it, they are the producers.

COMMISSIONER SARBIN: When I wrote a simple little book I still got protection. Even though somebody ripped it off a thousand times I wouldn't lose anything. You didn't ask that question about my books. You wouldn't ask that question about a pamphlet that you wrote.

COMMISSIONER HERSEY: You are a little bit different from IBM, aren't you? I'm talking now about the social consequences of what we are dealing with. Is our function to make it possible for these companies to have maximum protection, to give them both trade secrets and the copyright protection? Is our function to give them what they want? Or is it to judge whether what they want accords with what is desirable for the society?

COMMISSIONER PERLE: Why do we talk about IBM?

COMMISSIONER HERSEY: He is talking about his books.

COMMISSIONER PERLE: We are talking about everybody in this whole discipline, not just the giant. It is for damn sure that the developers are not going to invest time and money and effort.

COMMISSIONER NIMMER: That is the issue, we don't know if it is for damn sure. We know about two people. Do we have enough evidence of that?

COMMISSIONER PERLE: We can certainly go back and see what the programmer said. They said that they wouldn't be in the business if they couldn't protect it.

COMMISSIONER HERSEY: My question is whether the protections they have had up to now are not adequate. The industry is growing very fast. The figures we were given was that the rate is twelve to twenty five percent a year which seems to me to be at least in accord with what happens with industry in general, if not better. So the question is whether the protection that they have had is not adequate.

COMMISSIONER SARBIN: That really doesn't have much to do, does it, with the extent of the rip-off and the extent of the loss someone has

suffered. I really have a hard time with that conception.

COMMISSIONER HERSEY: I think if they are going to ask for new protection, then we should know that the protection is needed, shouldn't we?

COMMISSIONER SARBIN: Yes, but I don't think that that should be based upon the question of whether someone has suffered a million dollar loss or a ten thousand dollar loss.

COMMISSIONER HERSEY: No, but the question of whether a million dollar loss or a ten thousand dollar loss will have inhibited their development in ways that they can't absorb or wouldn't expect to absorb anyhow is a relevant point, it seems to me.

MR. LEVINE: I think perhaps another point is if in fact it is not happening now, is it likely that it may happen as the technology improves, as it gets easier to reproduce these chips in three seconds for ten dollars?

COMMISSIONER HERSEY: I think we need to know the probabilities.

COMMISSIONER DIX: The unstated premise of what you are saying I take it is that in our kind of society, generally speaking, the less regulation,

the better. We don't regulate unless there is a reason to. And the burden of proof is on the side of the reason.

COMMISSIONER LACY: Another issue one can assume is that the producers ~~on~~ of a data base ~~is~~ on programming generally get good protection. Whether they get it in ways that are socially less desirable than one might get by copyright, go back to the literary world, for example, Shakespeare writing before the Act, made quite a lot of money as a playwright and died a prosperous and wealthy man. One of the ways he did it was by making damn sure that in his lifetime none of his plays ever got into print. People who seemed to be taking shorthand notes in the audience were summarily kicked out and the notes ~~sieced~~ seized and destroyed so that he could maintain control of the plays, and you didn't get it to be commonplace where a playwright would disseminate his plays.

I think we have an analogy here in the way of computer material which is now available, itself, except that the proprietor feels that he can sustain a protection through contractually giving and sharing the trade secret. This may actually work reasonably well as a mode of protection. But over the long run

it may be a socially undesirable way of doing the whole trend of copyright which is in effect giving you protection as your reward for publishing and making available. We need to consider that.

CHAIRMAN FULD: Regardless of quantum of laws, isn't it always desirable to do whatever is necessary to protect against filching or appropriating someone else's ideas and seek to devise the best method of protection?

COMMISSIONER HERSEY: One fact in that, it seems to me, would be to test how much the protection is needed, how much it costs, how much actual crime there is taking place, and so on.

COMMISSIONER NIMMER: May I point out that you assume the conclusion when you say we must protect against filching and theft. By calling it theft then you have already assumed it is something contrary to public policy and law and so on. But, for example, in the realm of abstract ideas which are not subject to copyright and which everyone agrees -- not everyone, but most people agree should not be the subject of proprietary rights, we don't regard it as theft, we regard it as proper emulation or inspiration, or what have you.

So I don't think we can start as a given that it is clear from a policy standpoint that the computer program should be protected. We have to look at what the policy considerations are on both sides and then come up the balance.

CHAIRMAN FULD: If there is misappropriation.

COMMISSIONER NIMMER: If there is appropriation, whether or not it is misappropriation, is our question.

CHAIRMAN FULD: I would assume there is always a possibility of misappropriation.

COMMISSIONER NIMMER: Isn't that really a policy question? I am not suggesting my point of view, and I don't have a firm point of view on this. But I could conceive of a position that says that computer programs are directions for how to do things, and as such should not warrant proprietary copyright or other protection, and that taking it is not a misappropriation; it is a proper socially useful appropriation, that is a possible point of view.

CHAIRMAN FULD: I would take a different view on that without even knowing more about it.

COMMISSIONER KARPATKIN: We need to ask

those questions.

COMMISSIONER HERSEY: I am not arguing against protection. I am simply saying I don't think we have enough data to decide what sort of protection or to make recommendations about what sort of protection would be most socially desirable, particularly data as to how much loss there is from this sort of crime and whether or not that is actually inhibiting the creation of ideas and their dissemination.

CHAIRMAN FULD: It would probably be very difficult to arrive at. Is there any more to be said on this subject at the present moment?

COMMISSIONER NIMMER: Since this is being taken down, I want to add a footnote to Dan's comment about the First Amendment. I agree that the copyright clause was not inserted in answer to the First Amendment. In fact, chronologically it was in reverse order. But I do think that there is some distinction between what copyright represents and what the First Amendment represents. It is a matter of finding the appropriate balance. That is one way of talking about the balance between the interest of the creator and the interest of the public in dissemination. The dissemination interest in a sense is a First Amendment inter-

est.

COMMISSIONER LACY: And a copyright interest.

COMMISSIONER NIMMER: And a copyright interest.

COMMISSIONER LACY: Absence of copyright interest never inhibited authorship. What it did inhibit was putting up good hard money which is almost as precious to an author in the first place.

MR. LEVINE: The Office of Education back in the middle sixties decided that anything produced under Office of Education grants should not be protected by copyright. They should all be in the public domain, and the material was being produced and no one would publish it because the publishers could not get proprietary rights in it.

The Office of Education had to revise their policy and ended up granting a limited five-year copyright in order to increase dissemination.

COMMISSIONER LACY: I think that one of the things that does inhibit investment in this area now is not so much the weakness of protection as the uncertainty of protection. People hesitate to put several million dollars into a major venture in

a computer-based dissemination area when they simply don't know what the right situation is going to be. If they could continue to rely on trade secrecy and contractual agreement perhaps they would be willing to go ahead without any copyright protection. But I think the ambiguity of the protection is real.

MR. LEVINE: There is another factor, too. Some of the witnesses we have had said that it is at times virtually impossible to know whether their creation is being used inside of a computer. And I question whether giving copyright protection is going to change their policies one bit, if in fact they feel that they have all sorts of rights but they can't detect infringements.

CHAIRMAN FULD: Shall we leave it that there shall be further exploration and thought to the problem.

COMMISSIONER HERSEY: Would it be interesting for us to hear ~~what~~ from the various sub-committees, the direction they are taking?

COMMISSIONER PERLE: Before we get into that, what are our plans for tomorrow?

CHAIRMAN FULD: We will adjourn at two o'clock.

MR. LEVINE: To carry over any discussion that we haven't completed today. I want to raise with the Commission the question of whether what we call the Betamax question should be considered by the Commission?

COMMISSIONER PERLE: Which question?

MR. LEVINE: The Betamax, the video disc, whether that is within our jurisdiction and whether that is a problem that we ought to consider? Those are two items.

COMMISSIONER LACY: I would hope that if we don't finish here in the sub-committees this afternoon that we would go ahead.

MR. LEVINE: We would carry that over to tomorrow. I think some people have to leave at four o'clock, four-fifteen. It makes sense to end the meeting at that time.

COMMISSIONER PERLE: I have to leave at four o'clock. If we go over to tomorrow morning for the sub-committee reports, and we have nothing except discussion on the agenda, we could probably get through tomorrow morning.

CHAIRMAN FULD: Without starting the reports on the sub-committee items?

COMMISSIONER PERLE: Yes.

CHAIRMAN FULD: Does that meet with the approval of all of you? It is ten minutes to four now.

MR. LEVINE: I think two hours tomorrow morning, if we begin fairly prompt, should do it.

COMMISSIONER PERLE: Before we adjourn, we talked about our program here. On the way to lunch several of us wondered if it was a good idea to have the February meeting someplace where it was warm.

MR. LEVINE: The January meeting, not the February meeting. The February meeting must be in New York City or Washington.

CHAIRMAN FULD: We will adjourn then to tomorrow morning at ten o'clock in this room.

(Whereupon the meeting stands adjourned to November 19, 1976, at ten o'clock a.m.)

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TENTH MEETING OF THE COMMISSION ON :

NEW TECHNOLOGICAL USES OF COPYRIGHTED WORKS :

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New York Public Library
New York, New York

November 19, 1976
10:00 a.m.

B e f o r e :

CHAIRMAN STANLEY H. FULD
VICE-CHAIRMAN MELVILLE B. NIMMER
COMMISSIONER ALICE E. WILCOX
COMMISSIONER ARTHUR R. MILLER
COMMISSIONER DAN LACY
COMMISSIONER JOHN HERSEY
COMMISSIONER WILLIAM S. DIX
COMMISSIONER RHODA H. KARPATKIN
COMMISSIONER HERSHEL SARBIN
COMMISSIONER E. GABRIEL PERLE

S t a f f :

ARTHUR J. LEVINE, Executive Director
MICHAEL S. KEPLINGER, Deputy Director
ROBERT W. FRASE, Deputy Director
CHRISTOPHER A. MEYER, Staff Attorney
JEFFREY L. SQUIRES
DAVID PEYTON

MS. KEGAN (On behalf of the Libary of Congress)

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CHAIRMAN FULD: I call to order the second session of our tenth meeting for November 19th. I think the plan was to consider the reports of the various sub-committees.

Do you want, Arthur, though, before that, to make any announcement or any statements?

MR. LEVINE: Yes, if I may.

I thought that perhaps even before we got into that, we might get into the question of video disc and video tape machines, but prior to that I am going to pass around an envelope which has a plain green button in it which is the pass to get into Rosoff's Restaurant, 147 West 43th Street. Money is not required today.

There is a table reserved for CONTU members and staff in the Coach Room which is on the second floor.

The table has a sign on it which is CONTU.

JUDGE FULD: Is that where the speaker is going to be?

MR. LEVINE: The speaker will be in the Coach Room and there is going to be a huge turnout for the program.

Chuck Seaton told me there are 285 people who signed up to come to this luncheon, so he very kindly reserved me an entire table for CONTU.

JUDGE FULD: I think we owe a vote of thanks to Chuck for his courtesy in inviting us there. I hope it will be interesting.

MR. LEVINE: If you would just take one button and pass it around, please.

I am also passing around or perhaps we can pass out to each of the Commissioners the travel vouchers.

At the last meeting the question of whether the Commission ought to consider as part of its mandate the new video recording devices that we have all seen advertised on television was raised, and it was merely raised at that meeting and there was no discussion of the issue at that point.

I thought that perhaps this might be an appropriate point to discuss whether the Commission should get involved in that question.

The statute provides that we are to study and compile data on the reproduction and use of copyrighted works of authorship by various forms of machine reproduction, and it certainly seems that within that

general broad mandate if we wish to consider these machines and their activities, we probably could.

I think that nowhere in the legislative history, however, does this type of machine reproduction, the legislative history of the Commission, appear as one of the areas that Congress believed that we should be involved in.

That certainly doesn't mean that we are precluded from doing it, however. It just wasn't one of the new technologies that was feasible at the time that the Commission bill was being considered.

JUDGE FULD: It does deal with future contemplation of the art?

MR. LEVINE: Yes. Actually it is now a new technological use, certainly and that was not actively under consideration, I don't believe, when the revision bill was considered.

The question additionally though is whether there is something that is so uniquely new about this technology that it requires additional consideration or whether the revision bill adequately covers the problems that the video tape machines, private video tape machines present.

Just as there was a suit filed last week

in Los Angeles by either MCA or Universal and Walt Disney Productions against Sony Corporation and a department store, as I understand it, and individuals. I'm waiting for someone on the West Coast to send me a copy of the complaint, and I haven't gotten it yet.

As soon as I do I will pass it on to each of the Commissioners.

It alleges that Sony, by their advertisement, induced the copyright infringement, suggesting to people that they purchase these machines and record programs off the air.

The department stores, as I understand it, were sued because they were demonstrating the machine, using copyrighted television programs, and I guess the individuals were sued because they in fact were doing it at home.

MR. PERLE: Were they consenting adults?

MR. LEVINE: Under the Georgia case maybe it is permissible in the home.

It is just what the Commission was lacking.

MR. NIMMER: I want to add a kind of personal comment to this and I think I will put it out

before the Commissioners.

Universal and Disney have asked me to participate as an attorney on their side in the case. I may not be able to do so for other conflict reasons and that is not clear, but that to one side, I see a real possibility, and I haven't discussed it with the Judge and Art, a real possibility of a conflict as far as my being on the Commission, if we should go into that, and I'm by no means suggesting that we shouldn't.

It is not absolutely clear to me that it would be regarded as a conflict, but I think it might well be and I want to put it before you.

I see the alternatives for me and one would be to resign from the Commission which I am not going to do.

JUDGE FULD: You get more money from the Commission.

MR. NIMMER: Including the per diem.

Another would be to simply not get involved in the case which may well be what is the right answer.

A third would be for me, if we do go into this area, simply not to participate in that part of the Commission's activities. I don't know whether

that is a good resolution.

So I did want to put this before you and it has been suggested that maybe there are different regulations that go to this question, I don't know.

JUDGE FULD: Wouldn't it be a personal decision?

MR. NIMMER: Well, if the regulations clearly spell out the situation one way or the other, then I guess that would relieve me of the personal problem, but it probably doesn't.

In any event, that is the background and for that reason I am not going to participate in the discussion whether we should go into it or not.

MR. LACY: Mr. Chairman, I would recommend that we not go into this. It seems to me that so far as the issues are concerned, they exactly parallel the tape recording, acoustical tape recording of music broadcast by radio which has been an issue for a great many years and in which Congress was quite aware when they passed the bill and they indicated no desire to have us go into that.

I think it is clear that that is what they meant by machine reproduction. It doesn't seem to me that the issues are sufficiently novel to require

special attention to it.

The problem of enforcement is acute but of course there is a clear issue of how far it extends, but it is not a novel issue and it seems to me that the Commission couldn't make any particularly constructive resolution of it and it is a quite new field and it involves a lot of testimony from different sorts of witnesses about different sets of issues.

In an absence of a Congressional intent that we should do this, it seems to me that we have no mandate to take on an onerous and, it seems to me, a not particularly useful chore.

I would recommend that we stay away from it which would relieve Mr. Nimmer's problem about our having to go to it.

JUDGE FULD: Is that the infringement, the attachment of these devices to the television screen?

MR. LACY: I would assume not because it is quite conceivable there might be theoretically uncopyrighted materials that they could record.

JUDGE FULD: That stems from the attachment though.

MR. LACY: But it doesn't seem to be

different from the issue of obtaining a tape recording from an FM radio to record a musical program which has been a long-standing issue.

JUDGE FULD: That is settled?

MR. LACY: No, it is not settled, but I think Congress was aware of this kind of issue and didn't put it aside as it clearly did computer issues through Section 117, and as it clearly did photocopying issues through the diffidence and tentativeness of its recommendations on that. That is its indication for the need of review of them.

I don't see any evidence that Congress was trying to have us look into tape recordings, whether they be of audio or video programs.

JUDGE FULD: Well, would it be desirable to have a staff paper looking toward the problem and deciding that or do you think --

MR. LACY: As long as our decision is to stay out of it I don't see the harm in having a preliminary study.

JUDGE FULD: You think it is so clear we don't need a study?

MR. LACY: To me it is clear, but I don't mean to project my clarity on anybody else.

MR. LEVINE: May I, as a point of procedure, if you could just give your names so that the reporter can get acquainted with you.

We have prepared a staff paper which we circulated that attempts at least to explain what the law is now. It is somewhere in my briefcase. We have sent that to you all.

MR. SARBIN: I certainly don't see that the issue is any different from taping off the air. I see no particular reason for us to get into it.

As Dan said, our plate is full and I'm not sure that we could contribute anything or anybody has asked us to contribute anything. In the absence of the mandate why do it?

JUDGE FULD: Is that the sense of everyone?

MR. PERLE: No, I think that we have to at least touch upon it even as there are some other things that we have to touch upon such as the holograph.

I think that as long as we are aware of the technology we have to go into it enough to say we looked at this, the law as it exists and deal with it and, further, we feel that we should not go into it.

But certainly we can't ignore it just as we can't ignore any of the other technologies of which we are aware for machine reproduction of copyrighted works.

JUDGE FULD: That pretty much jibes with Dan's suggestion.

MR. PERLE: I don't think we can just ignore it.

MR. LEVINE: Let me just add one other footnote, and that is back when the cable problem was before the Supreme Court and going through the courts, the fact that Congress was considering revision of a copyright law and was going to perhaps legislate in the area of cable TV, I think did have an effect on the Court on those cases, and if this issue, at least a portion of it, is in litigation, the fact that the Commission is considering it or not considering it might have some effect on what a court might do, perhaps.

MR. MILLER: I agree with Gabe that before leaving it to one side we have to make first certain that it is true that it is no different than the magnetic tape or wire tape problem.

Almost all of our discussions of computer problems have proceeded on the assumption of alpha-

numeric display, whereas we already had a good deal of testimony about multi-media information delivery systems, one characteristic of which would be graphic display and there may be points at which video tape and computer graphics will overlap or interchange and video tape may actually provide one form of infringement of graphic display in a computer system.

So it is not that clear to me that the issues are entirely separate. In other words, with the combination of the information delivery systems it may very well be that there are interchangeable points between video and computer, so I think at least we have to look at that.

JUDGE FULD: I take it there is no objection to that, looking at it and reaching the results you want to reach.

MR. LEVINE: But with video tape being merely another medium upon which copyright --

MR. MILLER: That is right, another medium as the chip versus the deck of cards as a program. It may well be that certain computer type systems will be driven by something closely allied to what we call video tape.

JUDGE FULD: As I understand it we

will look into it briefly and reach a brief decision as to whether it is within our jurisdiction.

MR. LACY: I think the points Arthur raised about it -- and my main point is I don't think mere words "machine reproduction" should lead us into any machine. A printing press indeed is a machine and I think it is fairly clear what Congress meant by machine in this connection.

I think Arthur's point that it does inter-relate to computer uses is true.

JUDGE FULD: So be it. We will consider the problem, which brings us to what, Arthur? Any additional matter?

MR. LEVINE: No, that brings us to a discussion of the status of the various sub-committees at this point.

JUDGE FULD: The first on the agenda is the software discussion.

Gabe, would you direct yourself to that briefly and be supplemented by Arthur Miller?

MR. PERLE: Yes.

Broadly, the software sub-committee has come to the conclusion that the problem of computer

programs can be handled within the format of the existing copyright law revision bill, with perhaps some changes in specific sections or perhaps some new sections, but certainly not an entire new chapter or entire new statute.

Our general feeling is that computer programs should be accorded protection in the nature of copyright and protection which is desirable is protection against copying as such and protection against unauthorized use. Something akin to but not the same as the performance rights that appear elsewhere in the bill.

It is really in non-technical terms, it is to prevent ripping off. It is to prevent misappropriation.

JUDGE FULD: We have no model from the International Convention which was attempted?

MR. PERLE: No.

JUDGE FULD: They failed in reaching accord on it.

MR. PERLE: Well, they failed for a lot of reasons, but we think that our staff can get together the sort of statute that can reflect this thinking.

Incidentally, we, and the Judge and Arthur, at least correct me if I do not reflect accurately your feelings, we have no alternatives in principle. There are lots of alternatives as to the form of the protection, the form in which the protection will be accorded.

It can be done in a number of ways, but we do feel that protection should be afforded and the protection is proper within the copyright law.

Let the record show that Commissioner Miller shook his head in accord.

MR. MILLER: In dismay.

JUDGE FULD: Do you want to add to your dismay?

MR. MILLER: No.

MR. NIMMER: Let the record show he smiled after he said that.

JUDGE FULD: That reflects pretty much my thinking and I think Arthur also.

DR. DIX: Mr. Chairman, the Committee hasn't gone into such questions as duration and that kind of thing.

MR. PERLE: On that subject we universally feel, all of us feel it should be a shorter

term. How long is something that we are going to have to consider.

I might add a personal note here which I have not had a chance to throw out at the Judge and Arthur yet, and that is that my own feeling is not what was said yesterday that protection should be afforded in effect until the program becomes obselete, but, protection should be afforded for a limited period and then be thrown open to the public for access so that it may have access to encourage the promotion, the art, the science, if you will.

My personal feeling is that a program is not -- that software is not to be accorded the same sort of protection that a novel is to be accorded in terms of duration.

That programs, each program may intimately interrelate to the advancement of man's knowledge in science and the ability to communicate and, therefore, it would be socially desirable that other people gain access to the use of these programs at an earlier time than they might obtain access without the consent or permission, without infringement to a novel or something akin to that.

MR. NIMMER: Mr. Chairman --

JUDGE FULD: Yes.

MR. NIMMER: A couple of questions.

One, on your initial decision that there should be protection, I just want to inquire, relating back to a little dialogue we had yesterday, whether that is predicated on some sort of a prima facie assumption that anything that involves work and effort should be protected; or did you explicitly discuss the conflicting factors of the value of protection as against the necessity for protection, according to the issue;

but it still is the kind of equity question of whether people should be guaranteed by the law that they are going to be paid for the work they do.

I am not stating it well. I could start over again but --

JUDGE FULD: I think it is important to define use. Is that what you mean?

MR. NIMMER: Well, there are conflicting interests, obviously, the interests of the creator and public in this quick dissemination and as

unfettered dissemination as possible.

Generally in the area of copyright we reach at a balance by giving some limited monopoly for a limited period of time to the creator, even though that in some degree deters the public's ability to have complete access, we think on balance it is worth it, worth it to the public in the long run.

But I don't think that balance necessarily and always applies in all the areas where work and effort are involved. There are some areas where we think on balance the effort will occur without property status and at the same time the public will get a greater benefit if there is not this deterrent.

All I am saying is it should not be assumed without at least some explicit consideration whether or not in the first place protection is warranted.

I am just wondering whether the sub-committee did go into that or just simply started from the assumption that there should be protection.

JUDGE FULD: Protection only against copying would not be too helpful for the copyright proprietor, the unauthorized use of software and also should be an infringement, depending on how use is

defined for these purposes. It may be necessary to redefine reproducing/a copy to include the introduction of software in the computer storage.

MR. NIMMER: If I follow that, that goes into the question of what are the appropriate remedies.

If you once pass the hurdle of should there be a property status what are the rights that should flow from that property status, I should say if you once say there is property.

JUDGE FULD: I think we all thought there was certain property.

MR. NIMMER: That is what I am asking. Do you just start from that assumption or is this a --

MR. MILLER: I can only speak for myself in terms of our discussions. I started with the assumption which, until quite recently, I would not categorize as intuitive for me, that the kind of intellectual effort and that is infused in producing software and reflected in terms of the expression of the software, first on shown justified some form of protection and, secondly, was certainly indistinguishable from a variety of forms of expression and intellectual labor and just the drone labor which we have classically protected by copyright, the catalog,

commercial catalog being the most banal example.

So I started from that proposition that although it was not to me a work of art, it was nonetheless a work of intellectual quality embodied in an expression and it was impossible in any intellectual sense to distinguish it from so many other things that have gone over the dam and have come within copyright.

So to me the key is not the question of protection but the problem of defining the scope of that protection, of making sure that the remedies or rights that attend the protection are so shaved down and described, presumably through legislative history rather than statutory language which will be impossible to draft with precision, to make sure that what Gabe called the right of access is assured and that in protecting and insuring a reward for intellectual creativity you are not blocking access or ability to implement and use the technology.

That has the great risks that over time what standards you create are debilitated by socialist oriented and do-gooder type courts that don't understand all the background.

JUDGE FULD: I think that states it more clearly.

MR. PERLE: There are two other modes that we considered through which protection could be accorded. Starting again from a conclusion, from what we have heard in our hearings, I think what we felt in our gut as well, that protection was necessary and desirable.

We could have opted to say no, this is not the copyright, it should be trade secrets. The trade secret protection is adequate.

I think we reached the conclusion first that the trade secret mechanism in the long run would not be a viable mechanism or an effective one or a practical one and, second, if it were, trade secret by its very nature gives an indeterminate length of time of protection, a monopoly, if you will, which is protected by a trade secret mechanism and has been a trade secret since Coca-Cola was invented.

JUDGE FULD: Not before?

MR. PERLE: Maybe.

It was a private secret not a trade secret. So trade secret protection was out.

The other was something in the nature of unfair competition, misappropriation type of bill which

seemed wrong for several reasons.

First, this stuff does fit into the copyright mold. It is hard to take this type of intellectual endeavor and separate it out.

Second, misappropriation bills just don't fly. They just are not the sort of things that the Congress has paid attention to for a whole variety of reasons.

Just not a practical solution to this problem. Therefore we concluded on all these bases that copyright was right and appropriate.

MR. LEVINE: May I, Gabe, just ask whether you think that if in fact that is the direction the Commission goes, that the Commission report should also suggest that copyright be the exclusive method of protecting --

MR. PERLE: Yes.

MR. LEVINE: (Continuing) -- computer programs?

JUDGE FULD: Would that be compelled by the statute as a suggestion?

MR. LEVINE: Well, we are making suggestions to Congress and Congress can certainly say that the copyright law preempts any other form of protec-

tion for computer programs.

MR. NIMMER: Mr. Chairman, I didn't begin to complete my remarks. I will try to do so briefly which bears upon that.

First of all, with reference to the substantive question, this is not the place, this is not the time, it is not the place, to further debate the substantive issue that we talked about. I mean, we are just hearing the sub-committee report. At some point it is going to come before all of us and as such, we will talk about it.

I just want to say to make clear that I am by no means opposed to your substantive conclusion of protection. I am just not completely convinced and I think there is another side to be talked about and I do want to talk about it at a later time.

Going to the other issue that Arthur raised, Arthur Levine, under the new Act that we are going to have January 1, '78, the Act itself says nothing about computer programs but the Committee report in a kind of offhand way says that computer programs are included under the Act, which has a couple of consequences, it seems to me for our purposes.

One, then it may be that the net effect

of what you are recommending is really not protection but reducing protection, because if it is not protection it will be as of the new law, it will be protected like everything else for the full period of time and so on.

So maybe what the net effect of what you are saying is we want to cut down the protection that will be included in the new Act.

On the other hand, it is true that there is some ambiguity about it, the coverage under the new Act, because it is not exclusively stated that the report does say so.

Also, the nature of the rights I think are ambiguous, although in theory it would be the same right as any other literary work would have, I think.

Then that also bears on the preemption question. Jeff Squires gave us a paper on preemption, whether trade secrets are preempted by the new law and his conclusions were, which I agree with, is that the trade secret law is not preempted under the new law, but protects a property type protection, protects against the act of reproduction or the act of use not predicated on additional factors such as secrecy, just the mere bare protection per se, I think state law will be preempted by virtue of the new law and

assuming that new law includes trade secrets under its umbrella as the Committee report says it does.

So there is some pressure of preemption, there will be some pressure of preemption when the new law takes effect, but not going, and this is perhaps a debatable area, but not going to trade secrets as such because that involves some elements beyond the mere right to prohibit use or copying or reproduction. It involves at least the element of trade, treating it as a secret, within an organization and the other element necessary for a trade secret.

So it gets complex in terms of whatever the recommendations are, how they relate to whatever the new law means in this regard.

MR. SARBIN: You don't seriously think that anybody who has testified before on this matter of software protection is going to believe that Congress has acted to protect software because of what was in?

MR. NIMMER: I certainly do think that the Committee thinks that. I mean, the House Committee.

JUDGE FULD: I thought it had suggested that.

MR. SARBIN: Suggested?

MR. NIMMER: No, they say in a kind of

backhanded way, it is Section 102-(b).

MR. LEVINE: 102-(a) I think.

MR. NIMMER: No, but I think it is discussed in 102-B to distinguish ideas from computer programs.

MR. LEVINE: The history of copyright law has been one of gradual expansion and the types of works accorded protection and the subject matter affected by this expansion has fallen into two general categories and in the first, scientific discoveries and technological developments have made possible new forms of creative expression that never existed before.

In some of these cases the new expressive forms, electronic music, filmstrips and computer programs, for example, could be regarded as an extension of copyright of subject matter Congress had already intended to protect and would thus consider copyright all from the outside without need of new legislation.

Let me just peruse a little bit more --

MR. MILLER: What is the effect of 117 on that?

MR. NIMMER: As I see it, Arthur, that goes to the question of whether input and printout on a computer is an infringement of conventional works,

not to the probability of computer programs per se.

MR. MILLER: That is not the intent of 117.

MR. HERSEY: I know we may have discussion further but I must register promptly my opposition to this fundamental position, and I would like to frame my opposition in terms of skepticism about what we heard yesterday.

Basically my opposition comes on the grounds of the question whether these are writings of an author. These programs that we were given yesterday are beautiful to a trained eye but in terms of the fundamental purpose of copyright which was to encourage creation and dissemination of literature, of practical writings, poetry, history, philosophy and works on science, this is gibberish. But that isn't really the point.

The point, it seems to me, comes in what follows from this as described to us yesterday. Mr. Mc Cracken called them translations. I think of them as transformations leading from the source program to an object program and eventually to a circuit.

It seems to me that this problem is dramatized when you remember what he said about the

future with the increasing sophistication of these machines the point would come, he said, when the fourth program would be four words, "Do so and so".

By tapping out "Do so and so" you start electrical impulses in the machine which then makes its own program, does its own transformations and carries out the task which may or may not be socially useful in the end.

It seems to me that tapping out "Do so and so" is just the same as what happens when you turn the starter key on my automobile. Electrical impulses go through the motor and the various parts work together to produce a product which is motion which may or may not be socially useful.

JUDGE FULD: But isn't the whole thing envisioned by the human body?

MR. HERSEY: Let me try to finish this.

The parts of the engine were presumably described in the first place by an engineer and then transformations took place.

The descriptions went to specifics and then to working drawings and eventually to the part but the fact that was described in language in the first place doesn't seem to me to make a carburetor the

writing of an author. A piston is not the writing of an author.

There are weaknesses in this analogy, I recognize, but it has some force, it seems to me, because Mr. McCracken kept insisting that every automobile has or will soon have two or three microcomputers in it as part of its functioning.

So that the writings of these parts join the writing known as the carburetor and the writing known as pistons in the motor.

To me an electrical range in the kitchen is a gross chip. It is a series of electrical circuits tuned on and off by switches.

It was described at one point certainly in its development as language but it certainly isn't the writing of an author or a television set of which the circuits are certainly produced now with the help of computer programs and which has an end product of visible language and pictures, audible, or it is not the writing of an author.

When Mr. McCracken yesterday showed us the piece of hardware, a circuit plate, he did a kind of magic trick. He took out an element from that and said "Presto, this is no longer a hardware, this

is the writing of an author."

I think it is absurd on the face of it to say that a chip is the writing of an author. It is an electrical circuit, and I resist the argument that because the copyright act has admitted a lot of funny things that we should say throw in the kitchen range too.

The House threw out . Title II, there was a recognition of the fundamental purpose of a copyright, of copyright and I think we can confirm that fundamental view, not move away from it farther.

I would hope that we would find another form of protection if more protection is needed and on that score I am skeptical as I tried to say yesterday afternoon, but if more protection is needed, surely there must be another means of protection which is viable even if it be discovery of a new principle of law for a new situation.

I beg us not to protect electrical circuits under copyright.

MR. PERLE: With all due respect, John, it was not our intention to protect electrical circuits nor did we reach this conclusion after Mr. McCracken spoke to us yesterday.

I think that one of the problems here is perhaps a matter of semantics.

Nobody --

MR. HERSEY: Oh, yes, it is. It is language.

MR. PERLE: I think that there is a sufficient number of people, not the least of whom is yourself who can use language exquisitely on this Commission so that we can solve whatever semantic problems we have.

Nobody intended to protect, as to the writing of an author, something which is analogous to turning the switch on a car. We do not intend to do that.

What we intend to protect, as I understand what the sub-committee intended is the intellectual endeavor which results in something which is fixed in form and which falls into all the other classic measures as we perceive it.

MR. HERSEY: May I stop you there? Fixed in form seems to me one of the fundamental problems here. So much of what happens in programs on a day to day basis is transient and we have had evidence that programs have a life of from five minutes to maybe

six months.

MR. PERLE: Nonetheless, even if a short period of time, the problem then becomes another question of draftmanship of how do we deal with a constantly changing program, one which is changing every day.

That too I think could be handled by draftmanship.

MS. KARPATKIN: What we have in the marketplace, if we have the kinds of protection we envision how would it work?

MR. PERLE: I think it would do two things. One, it would break -- you mean how --

MS. KARPATKIN: Use and payment requirements, how would people get to use the programs?

MR. PERLE: They would get to use the programs by acquiring them in whatever form, the whole variety of forms there may be. Incidentally, they don't have to be chips, bubbles.

MR. HERSEY: Not copyright bubbles either.

MR. PERLE: This leads us to a whole lot of other things, not the least of which is songs.

They would acquire the same way they

acquire any other copyrighting material, from the copyright proprietor or those authorized by him to sell making public vendor licensing.

It wouldn't have any effect on the marketplace other than, A, give the copyright proprietor a viable way, a practical way of pursuing his economic due, if you will, and, secondly, in the marketplace, prevent locking up information permanently under the trade secret.

JUDGE FULD: Isn't it oversimplifying to say that it is initiated, a work of art, by the individual, and what follows is mechanical but nevertheless the initiation is what is important?

MR. HERSEY: Well, there are initiations of all sorts.

JUDGE FULD: If you deal with patterns.

MR. HERSEY: There is intellectual activity to make the kitchen range.

JUDGE FULD: These are inventions rather than intellectual product.

MR. HERSEY: Well no, certainly intellectual work goes into it.

JUDGE FULD: Intellectual work product.

MR. HERSEY: There seems to be some

other fundamental difference too. You spoke of an individual and yes, it seems to me that copyright was assigned to protect the work of an individual.

Here we are dealing for the most part with corporations and many of them huge corporations, and it seems to me there is a fundamental difference in the kind of protection that is offered and the nature of the way it works out.

MR. PERLE: May I read him the statute? The same or substantially the same language under Section 117. This is both the House and the Senate talking.

MR. LEVINE: You have it in this piece of paper we just handed out.

MR. PERLE: It is there. The provision 117 deals only with the exclusive rights of a copyright with respect to computer uses. That is the bundle of rights specified for other types of uses in Section 106 and qualifies Section 107 with respect to the copyrightability of computer programs, the ownership of copyright, the term of protection, and the formal requirements of the remainder of the bill, the new statute would apply.

Congress has spoken. We are going to

tell them to change some of those things.

MR. HERSEY: Yes, I don't think we have to regard what has been done in this area as final. We are set up as a Commission to deal precisely with this.

MR. NIMMER: It is not moot, it is still before us, what we want to recommend. We have to start from trying to understand what Congress has done but it still is up to us to either say Congress should undo what it has done, Congress should extend further what it has done or we should leave it alone.

MR. MILLER: But it does cast out, with all deference to John, on John's statement, that the statute reflects a fundamental conception about writing, the authors --

MR. HERSEY: I said the original intention of copyright, the original intention, let us be clear about that.

Where did it start? It didn't start to protect --

MR. MILLER: Arguably it started with a lot of mechanics and artisans centuries ago who wanted protection for the verbal representation of some of their scientific works, like the manual for the electric

range or the schematic.

MR. HERSEY: Should be copyrighted --

MR. MILLER: The description of how to manufacture.

MR. HERSEY: But that is not the range.

MR. MILLER: That is not the range and I think what Gabe was saying a few minutes ago, we are not protecting the circuitry.

MR. HERSEY: Or the process in creating the range which you are protecting.

MR. MILLER: Again with all due respect, these categories will simply break down and three centuries of four centuries later we no longer can focus on the word "copyright" thinking that it has the same meaning and significance in a complex intellectual and artistic environment in the mid-twentieth century, the way rather simple notions of the statute have a Miro is gibberish in its own way, Calder is gibberish in its own way but because of a more catholic approach to art and intellectual productivity we recognize it.

MR. HERSEY: But they are the works of individual artists, Arthur. You attack a fundamental cultural notion here and I think it is one that we should think very seriously about, very seriously.

JUDGE FULD: I resent the inclusion of Miro and Calder.

MR. MILLER: In what?

JUDGE FULD: In what you said. I let that pass.

MR. MILLER: I didn't say I thought it was gibberish but to the eyes of many untrained it is gibberish.

MS. KARPATKIN: This dialogue took place on at least one other occasion before we heard any testimony and it reflects, I think, the nature of the report which we were given because perhaps the shorthand way in which you describe your results, what seemed to be missing and would be a necessary pre-requisite for this Commission not only to conclude anything but to discuss anything, is some definition of the public interest and how it is served by various courses of action, including non-protection and various forms of protection and various degrees of protection.

We would have to have by either searching the record that we have before us or getting new information some definition of the effect on the marketplace and on competition, assuming we think

competition is a value or is in the public interest, some definition of the effect of these various courses of action on the marketplace and on competition.

We would have to have some study of the positions taken by the various interests that appear before us.

I have a staff paper, I don't know if it is dated or not, which says here perhaps the majority of producers are satisfied with things as they are. There is a lack of consensus as to the nature and characteristics of an ideal system of protection.

I would trust that the conclusions you reached are based on all of these factors, and it seems to me for us to have a sound discussion as a Commission that has been taking testimony and reading papers ad infinitum that all of this would be before us in some way that we could focus on it and study it and then draw a conclusion.

I don't know how to react what you reported because it seems to me to be a sort of gut reaction of a sub-committee rather than the result of --

JUDGE FULD: Was intellectual, not gut.

MS. KARPATKIN: Some combination of gut

and intellectual reaction rather than the result of a serious study of everything that has been before us and an assessment of what else we have to do in order to reach our conclusion.

JUDGE FULD: It poses a problem and we present it for the consideration of the Committee and the sub-committee as a whole. We are hearing diverse views and we will take them into consideration.

MS. KARPATKIN: I want to ask the subcommittee how do you evaluate the effect on the marketplace in terms of an expansion or a protection of competition within the marketplace in each of the various courses of action you studied and rejected?

JUDGE FULD: It lowered the price.

DR. DIX: Mr. Chairman, I would like to associate myself with those remarks too, to some extent, at least in the emphasis. I am not sure what kind of hard evidence we can get.

But while we are sitting in this room I would just say from my point of view a key word is the one over the mantel there, over the name of Thomas Jefferson, the word "diffusion". Let me just since the stenotype record will have it, it is a great statement:

"I look to the diffusion of light and education as the resource most relied on for ameliorating the condition promoting the virtue and advancing the happiness of man."

JUDGE FULD: Man and woman.

DR. DIX: It seems to me the test, one of the test words that we should apply is what effect whatever action we take or we propose would have on diffusion.

This is obvious, but I think this is what the last speaker had in mind, was some test on the public effect of all of this.

MR. NIMMER: Well, first a word on Rhoda's comments.

I agree that this is desirable and I hope we can get more specifics on it, but I have some doubt as to how much hard data we can get on that any more than we can get hard data on what would happen to book publishing if copyright was eliminated for books. I'm not sure whether there is a way to know that. Maybe there is. Steve Bryer wrote a piece on it but I don't think he told us too much.

On the other hand --

MS. KARPATKIN: We know what the market-

place has produced up to now with the current state of protection and that is some hard data.

MR. NIMMER: True, true, but I don't mean to negate the suggestion. I think it is worthwhile, but I would simply put in the caveat that it may, there may be realistic limitations on how much we can get.

I would like to go back for a moment to John's point and the conventional notion of copyright which I am sympathetic to. I do disagree with him on one distinction he makes, that is the distinction between the individual and corporate giants. I don't think that that is a distinction that will work because individual authors or others in marketing their works, given the structure of our -- how our society necessarily works through a corporate giant, I don't think you can make a law for one and not for the other.

But that to one side, there certainly is and Arthur Miller makes the point that copyright, that one cannot make, draw lines between different varieties of intellectual works and that we are far progressed from the Statute of Anne, all of which is true. Line drawing is difficult, but I am not sure

that it is something that we should therefore abdicate.

We should attempt to draw some lines on the fringe. It may seem arbitrary but nevertheless, it may make some sense.

I remind you that there is a line of cases in copyright law up to now and that the new Act does not, as I read it, effect one way or the other. That is called Baker vs. Selden line/which I have written and expressed disagreement about but it has some positive sides to it in this sense.

What that had to do with, the original case had to do with a book that included in its appendix forms for accounting purposes, double entry bookkeeping, that sort of thing, and somebody else wanted to reproduce those forms and those accounting sheets and the U. S. Supreme Court said no, copyright doesn't go to that purpose.

You can reproduce it for purposes of explanation but not -- I mean the copyright can stop reproduction for purposes of explanation but not reproduction for purposes of use.

And more to the point, there is a fairly recent case involving an advertisement on entering a contest. What you do is put down your

name and then you write fifty words or less on such and such a subject and then, I don't know, you put in some other specifics.

Somebody else reproduced those instructions almost word for word. Not precisely word for word and the court, following the Baker versus Selden line said no, you can't claim copyright in those instructions.

Well, that begins to have some arguable relevance to computer programs. What are computer programs but instructions on what to do?

Now, I am not posing that and obviously even if it were squarely in point it doesn't limit us on what we want to recommend.

I pose it simply for the point that copyright principles have recognized this kind of a distinction up to a point, and we should think long and hard before we decide to depart from that kind of line.

MS KARPATKIN: With all due respect, Mel, that is exactly the line that the sub-committee was working with and that is exactly what I meant when I said that the broad principle as conceded the sub-committee was to recognize a copyright as a form of

protection and I am really getting to hate that word "copyright" which is just sort of a piece of cryptography developed ex post facto anyway, developing some form of protection and through the legislative materials and hopefully through the judicial process, rely on the application of the Baker and Selden and Morrisey type doctrines of shaving the scope of protection down to assure access to the intellectual worth of the program and utilization of the worth of the program.

That is exactly the analogy and exactly the theory that we were working with.

So that over time, even if you protect the program, you would protect it from the Chinese copyist who would simply reproduce it.

You might protect it from somebody who would borrow the program, physically take it and use it without a license, but you would not protect anybody, in line with my questioning of Mr. McCracken yesterday, who would look at the program and say, "Aha, I see computer idea A through N and I am going out and do my own program" which may or may not incorporate large parts of the conceptualization of the original program which, I take it, is sort of what Baker and Morrisey and Beardsley and a few other cases are driving at.

MR. NIMMER: May I respond that Baker is being so read as simply stating the old proposition that ideas as such are not protectable and anybody can borrow an idea as long as you don't borrow the expression.

That is a possible reading of Baker versus Selden and Mazer versus Stein and the court suggested that is the way to read Baker versus Selden but that is not really what Baker versus Selden says and is not really what Morrisey says.

Morrisey is in the instructions case and as I read those cases they prohibit not just the taking of the idea of the accounting forms or the idea of the instructions, I mean, they not only say you may take the idea, they say you may take the expression of it and the reason you may take the expression of it is because if we protect the expression then we are necessarily protecting ideas too, since there are very limited ways to express this idea.

MR. MILLER: That is why I questioned Mr. McCracken yesterday about the numbers of variations you could use to construct programs and moving from source programs to object programs.

I agree with you that Morrisey and Baker

deal with the situation in which you can't protect the expression because protection of the expression blocks access to the idea.

There are only a mathematically finite number of ways of playing these gasoline station games involving your social security number.

There is only one way to draw the account, a double entry bookkeeping, but if we are to pay any attention to our record, our record is rather clear and rather unanimous on the proposition that there are virtually an infinite number of ways of getting here to there, articulating a set of instructions to a machine in something we call a program.

Unless we want to disbelieve all of this we are dealing with an art form, forgive me, John, analogous --

MR. HERSEY: It is not an art form.

MR. MILLER: Analogous to music which is mathematically limited to a degree, but not as finite as Morrisey or the Baker problem.

MR. HERSEY: I suggest the reason you hate the word copyright is because you are attacking its fundamental center.

MR. MILLER: No, we disagree, John,

there is no point in pursuing it.

What we are doing, I believe, is not protecting the copyright, we are protecting the intellectual and artistic work and intellectual work can embrace what the scientist does in this format.

MR. LEVINE: Just a couple of things.

One point that John made. Back originally when motion pictures were produced on paper prints and then they went to acetate, nitrate, rather, and that was found to be not a very stable medium to reproduce motion pictures on and they went into the celluloid, I guess that is what it is called.

Now, video tape material and presumably in the future it is going to laser technology, so what I am suggesting is that the chip may merely be the particular form in which the work or authorship may be embodied, but that is a quesion.

There are transformed steps that go along and that is number one.

Number two, there is also another case, the Beardsley case which suggests, Beardsley versus Continental, and I haven't read it for a while, but as I recall it involved an insurance form and the question was whether you could protect that insurance form and

the court said yes, that is copyrightable but slight variations from that would not be an infringement because there are only a limited number of ways to express the material that is embodied in that insurance form.

That is another approach to this idea, the expression problem, and probably one that is more appropriate in the computer program area or perhaps appropriate in the computer program area because it may very well be that what the Commission suggests is merely that an identical copy, a Chinese copy of a program may be all that should be protected against.

There was another point that I was going to make which escaped me, but -- oh yes, I just wanted to set -- Mel did this in part -- set the framework from where we are now or where we will be January 1, 1978, I think under the bill where a computer programs will be protected.

I think that the term of protection will be 75 or 100 years. I think that computer programs will probably also be entitled to protection under the laws of trade secrets, and so it may be that we want to begin with that as the jumping off point from which we make recommendations, no protection perhaps,

and protection --

MR. PERLE: Point of order, Mr. Chairman. Are we going to go through this plenary discussion of each sub-committee's report this morning or are we going to get the reports this morning?

Because I respectfully submit that we probably should get all the reports and then start discussing them, because this particular discussion can go on for the rest of the day.

MR. HERSEY: But we went quite far in committing ourselves to a line without our having ever had a chance to explore these arguments.

MR. PERLE: John, I don't mean to preclude discussion, it is just that I would like, for one, to have all the sub-committees report and then go back to discussion. I don't mean to cut off discussion.

I mean let us not have this plenary discussion now. Let us get the other reports.

MR. NIMMER: I agree with that, Mr. Chairman. I just want for the record to say that my failure to respond to Professor Miller's description of Baker versus Selden does not mean that there aren't further matters to be discussed in that regard.

MR. MILLER: Does that mean I have to live with two months of anxiety waiting for the other shoe to fall?

MR. NIMMER: No, my suggestion is that you let the chip fall where it may.

JUDGE FULD: I think you might write letters between yourselves.

MR. MILLER: All we can do is give references.

JUDGE FULD: I think the idea is a good one. Let us go on.

These were staff reports to the sub-committee itself and the sub-committee had not given complete thought, although I think it reflected what our thinking was when we met with staff, connnected with software and I think the same with the others.

Shall we go on to data base?

MR. HERSEY: This was presented as the conclusion of the sub-committee, not as a staff recommendation.

JUDGE FULD: It was a staff recommendation.

MR. HERSEY: No, this was presented --

MR. PERLE: This was my restatement of

the understanding that we had in part embodied in the staff report.

JUDGE FULD: I don't think it was so entitled?

MS. KARPATKIN: Where is the staff report?

MR. LEVINE: It is not a staff report. There is a staff memorandum which presumably summarized the discussions of the last sub-committee meeting. It is not a staff report, it is not staff conclusions.

MS. KARPATKIN: When was it circulated?

MR. LEVINE: To the software sub-committee --

MS. KARPATKIN: What is then the procedure if all of this has been happening and there is a memorandum and there is a report? Is it intended that we were to discuss something knowledgeably?

MR. PERLE: Wait a minute. The staff memorandum was an aid memoir and I thought and Arthur thought and the Judge thought that it did not adequately or sufficiently reflect certain portions of our thinking.

The sub-committee report is now in the

record and that is the only sub-committee report that there is, that report which I gave orally this morning.

MS. KARPATKIN: What happens next?

MR. PERLE: We will get the other sub-committee reports and then we will discuss, we will get whatever additional testimony, I assume, the other members of the Commission wish and we will reach a conclusion as a Commission.

JUDGE FULD: Make more definitive our views and get a more definitive Commission report.

MR. NIMMER: Mr. Chairman, what we have, an entire meeting devoted to nothing but -- no testimony at all, just our discussion, our feelings about computer software and another entire meeting having to do with each of the other sub-committee topics and there may be more than one meeting.

JUDGE FULD: That was my thought and I thought it would be taken up at the next meeting.

MS. KARPATKIN: Preceded by the dissemination of what kind of information? Is it more off the top of our head, and discussion?

JUDGE FULD: No, it ought to be gut and intellectual.

MR. PERLE: May I say, Rhoda, I don't

think this is off the top of our heads, This was based on the record and our interpretation of the record.

I don't think this is the time to discuss how we get the testimony in the public interest. I think that we can determine the public interest as well as anybody else can. Be that as it may it was not off the top of the head. It was based upon the record and I really think we ought to proceed and get tothe otner sub-committee repo:ts.

JUDGE FULD: What I am suggesting is that I think that our sub-committee should write a more definitive report, clearer and possibly a little more lengthy and have any contrary reports put in the statement on that sub-committee and discuss it at our next meeting and that should be the format for each of the sub-committee reports.

MS. KARPATKIN: Mr. Chairman, I would like to see the basis in the record set out which support the sub-committee's conclusion.

I would like the staff to go back to that record and say here is the material in the record which leads us to this conclusion.

JUDGE FULD: I am not too sure that is feasible or physically possible. We will do the best

we can.

MR. PERLE: I am not sure it is advisable. I think it is a waste of time.

JUDGE FULD: I have a couple of rooms devoted only to the material I have already received from the CONTU group. I won't be able to walk between two offices to get everything.

MS. KARPATKIN: Maybe they can do it briefly.

JUDGE FULD: I suggest briefly, yes.

But I say that I think there should be a sub-committee report more enlarged than it is, clearer than it is and have a contrary report based on the record, whatever you choose to do and have it done with respect to the sub-committee reports and we should turn to the other sub-committee report on data bases.

I think Mr. Lacy was going to report.

MR. LACY: Mr. Chairman, there is no report of the sub-committee itself since it hasn't met.

JUDGE FULD: Those are the best.

MR. LACY: The chairman of the sub-committee, George Cary, is not here today. It was set forth as his personal views not as a sub-committee view and since he is not here I could summarize briefly

saying that he felt that the language of the statute setting up this Commission intended us primarily to concern ourselves with the status of owners of conventional copyright on the use of their works in computers and computer systems.

We are not really mandated or authorized to go into the copyright status of data bases, but that data bases were probably adequately protected under the new statute as it will go into effect in 1978 and hence we didn't need to do anything about it if we were authorized to do anything about it.

If we did need to do anything about it we did not know enough about it to do it and hence we should seek some more testimony.

For my part I differ with most of those conclusions, though I think it is true that the somewhat ambiguous language of the statute setting up the Commission was originally drawn in 1967 and addressed itself to the two matters of which the Senate Committee was then most aware, primarily the input and the output of copyrighted works in the computer systems.

It is perfectly clear, it seems to me from the legislative history of the House consideration

that they really were washing their hands of the whole range of most computer problems and were really expecting this Commission to deal quite broadly with computer problems and I think it was the Committee, you may remember, refused to give any serious consideration to the Information Industry Association's recommendations for legislation on this point on the grounds essentially that this Commission would deal with it, and the committee didn't need to so I think we do have a responsibility to deal with data bases.

While I think that we may well come to the conclusion when we face having to come up with specific recommendations that there are specific areas of which we don't have adequate information and hence would need to express ourselves to getting that specific information.

I do believe that we have enough testimony at hand to at least begin to attack the problem.

My own feelings on this and incidentally, the third member of the sub-committee, Mr. Wedgeworth, really hasn't had the chance to take much active part in this and I don't know what his views would be.

My own feeling is that in view of the

rapid changes in the technology in this area we ought to avoid the temptation to propose legislation addressed very specifically to issues presented by the immediate present state of the technology which is likely to become quickly obsolete and then so far as possible try to express our own conclusions in terms of general principles which might have a long applicability, and I will lead into this, perhaps, in the course of the application of those particular situations.

A second feeling I have is that the basic principles of copyright apply themselves quite well to the problem of data bases and what we mostly need are some definitions that would bridge, apply, connect the existing body, the traditional body of copyright principles to this situation.

I made an effort to scribble some notes on this which are purely personal and in no sense a reaction of the sub-committee.

I would take it that the Chairman disagrees with them and I have some copies here if people would like them, which suggested that we might want to define a data base as a set of data selected and organized in such a way as to facilitate access to any individual datum or subset of data.

A machine-readable data base is a data base embodied in such a medium and associated with such programming as to enable any user, by means of a computer, to extract in tangible form or by display an individual datum or subset of data conforming to predetermined criteria.

A machine-readable data base is published when it is offered for sale in tangible form.

The author of a data base is the person who selected and organized the data or caused them to be selected and organized as a work for hire.

Moving from the definition to rights, the author of a data base is the proprietor of copyright in the work of selection and organization, including the association of programming of the data base and that the rights in a published data base are those now existing in such data bases as, for example, dictionaries.

The author of an unpublished machine-readable data base has an exclusive right over the extraction from the data base, by the intervention of the associated programming, of any datum or any subset of data, whether by display, printout or embodiment in other media.

That is, if you have an unpublished machine-readable data base you control access to it.

One does in practice, in fact in any event, but this would define that as a right.

The author of a machine-readable data base is also the author of any data base that consists of a subset of data extracted from the original data base by means of the associated programming.

This is intended to deal with the situation in which a person who has on line access to a data base and its programming, addresses a query to the data base for a bibliography on a particular subject for a list of all corporations in a specified industry that over a ten year period have an annual growth in profits of ten percent compounded.

So that the subsequent publication of such a subset of data extracted from the original data base

would require the permission of the proprietor of the original data base, permission that would normally be given by contract governing the access.

You may remember this issue was raised

by one of the witnesses at our hearings in Los Angeles of the fact that they were prepared by extraction from the data base that they organized and controlled a particular bibliography intended for the specific use of the client who bought it and the client would then subsequently publish it, depriving them of the market to provide the similar thing.

Limitation of the exclusive right of the author of a data base extends only to his selection and organization of the constituent data and, in the case of machine-readable data bases, to its association with the relevant programming, and do not extend to the individual data, or to any selection and organization of the same or similar data by others.

As I say, this is not a report of a sub-committee. This is a personal set of suggestions.

I agree with the procedural thought that what we need to do is to have each sub-committee with the participation of the staff to present the report. And I would urge that this report be in the form of statutory, be it a draft of the form that we might ultimately submit in statutory form, simply because only when you get to that point do you see all the problems that are going to be involved and supported

by a report that is, as Ms. Karpatkin has suggested, to indicate the evidence for the conclusion that had come in the hearings or indicates hypotheses as to the facts that underlay this and with suggestions as to how those hypotheses can be verified.

We ought to then devote ourselves to a session as long as necessary to reach substantive conclusions that these, and I don't mean by recommendations, but recommendations of the several sub-committees are in good enough form to invite the testimony of witnesses on them just as a Congressional Committee invites testimony on a draft bill.

Because I think you are going to get relevant testimony from now on only when it is addressed to specific propositions.

Otherwise we will get, as I think we did yesterday, testimony that is interesting but really simply repeats much that we have heard before.

Let me add my own procedural question. In view of the necessity to cancel our December meeting I would think it would be desirable to devote the January meeting to this rather than to the planned testimony on photocopying, because otherwise we will be three and a half months before we get back to

the things that we are now doing which would be in February.

MR. PERLE: Off the record.

(Discussion off the record.)

JUDGE FULD: On the record.

Does that conclude it?

MR. LACY: Yes.

JUDGE FULD: Any discussion?

MR. NIMMER: Just a brief comment, if I may.

Incidentally, it seems to me to be good, I mean Dan's comments I think make sense and are in line with prior approaches, copyright approaches to other non-computer type data bases which doesn't necessarily make it right but I think it is right.

But I wonder if there is some inconsistency between your last paragraph and your next to the last paragraph.

MR. LACY: The last paragraph in which --

MR. NIMMER: The one labeled "Limitations", and the penultimate paragraph where you say, if I understand what that means, if an individual takes or suppose that I go back to my favorite, the Encyclopaedia Britannica, , a kind of data base, and suppose I

want to do a little essay on the capital cities of the nations of the world and I go about it more laboriously than I suppose I would have to by turning to the article, each article on a given nation of the world and the Encyclopaedia Britannica in that article and just look for the name of the capital city and when I see it I would write it down so that I end up with a list of 150 capital cities.

I get each one from the appropriate article in the Encyclopaedia but I am now arranging those in alphabetical order according to the name of the capital city, not to the name of the country, to just get a completely different order than the Encyclopaedia has.

I am just taking a fact out of each article but I don't think that under conventional principles it would be nor should it be considered copyright infringement.

I don't think the Encyclopedia should have any complaint on this.

Under your next to the last paragraph would there be a cause of action there?

MR. LACY: No, but at least that wasn't my intention. What I had in mind was something

like this, to take a concrete true example, there exists a data base called Compustat which we had testimony about which is produced by Standard & Poor's, putting people on warning that there is a subsidiary company of the company by which I am employed.

Compustat exists in magnetic tape form and the records for each of several thousand corporations, an elaborate body of financial data drawn from their annual reports and documents filed with the Securities and Exchange Commission going back for about twenty years.

Basically the data in it for the most part is in the public domain, that when preparing the Compustat tapes certain editorial steps were taken to make sure the figures are compatible between two companies that may have used different definitions.

There is also associated with that a body of programming of which Standard & Poor's is also proprietor, that enables one to extract from that data base a subset of data which would also be a data base arranged according to predetermined criteria.

One could, for example, draw from that a list of all the companies in the electrical machinery business who had assets of more than $50 million but

less than $500 million who had paid dividends regularly for fifteen years and whose rate of growth has been such and such.

In fact, extracting such lists is one of the things that you do with Compustat.

Now, if one uses the Compustat programming and the Compustat data base to extract such a list, it would seem to me that the proprietor thereof would be Standard & Poor's, though normally nobody would go to the expense of doing that without some understanding from Standard & Poor's, nobody would pay for the access time as to what it's rights were, if any, which might be simply to have such a list for your own purposes.

A corporation that wanted to buy a company in the electrical machinery business that had these characteristics might make such a list for its own purposes.

If it wanted to publish the list, since offering such lists is one of the ways Compustat makes money, then he would need the explicit permission to do it.

It seems on the other hand it is perfectly possible for anybody else to do it, very

laboriously, to compile a list of electrical companies that have these characteristics and certainly there would be no limitation on somebody else's ability to do his own work in compiling.

MR. NIMMER: But is it based upon the fact that you have a program that will pick out that sub data base?

MR. LACY: Well, that is one thing. The other thing is the data base itself has been a symbol in such a way and put in such a form, i.e., on magnetic tape, other than simply in print that enables the subset data base to be extracted.

MR. NIMMER: Suppose I use my own program with your data base and my program will select the subset data base out of your greater data base?

MR. LACY: Well, I think of course to get the access to the greater data base in the first place you would have to have a contractual relationship, and, as a matter of fact, I don't think it would work, but the ability to employ your program to it would have to be a matter of licensing and whether you are permitted this, the proprietary right or not depends on what you do and very much in the way

someone sells or rents an educational film to a school that carries with it an implicit license to exhibit that in classrooms in a school.

Sometimes it is an explicit license but one has to come back to the proprietor rights in film to seek other use, e.g., to put on the local public broadcasting station or to show it in a theater to which an admission is charged.

JUDGE FULD: I think we might turn to the report of the sub-committee on photocopying now.

MR. PERLE: A question, will we get something, Dan, a written report, from the sub-committee before the next meeting?

MR. LACY: I will use my best endeavors but I am not Chairman of the sub-committee.

MR. LEVINE: I will speak to George Cary when I get back.

MR. HERSEY: I must say I am discouraged by the procedure here. I understood after our California meeting that the sub-committees would present us with options that we could discuss.

It seems that instead we are going to get drafts of legislative language that we are going to use which makes a big jump, which commits us far

more than --

JUDGE FULD: I thought the next meeting might have the sub-committee reports and have opposing reports from members.

MR. HERSEY: But we already had a conclusion from one committee and a suggestion from another that has inertia.

MR. LACY: There are two quite different options, George Cary's and mine.

JUDGE FULD: That was not definitive nor was it complete. We will have a more complete report for the next meeting.

MR. LACY: I think it is perfectly possible for the report to present options. I could easily present a number of options to what I recommend, the options I considered and rejected in my own mind.

JUDGE FULD: We could do that, alternative options and I suggest --

MR. PERLE: I wouldn't want to but we could.

JUDGE FULD: I also have objections.

Shall we pass on to the photocopying sub-committee report?

MR. NIMMER: All right.

You will recall that the Commission early on made the decision to defer the photocopy issue until later, first going into the various computer aspects.

This means that we are behind the rest of the group, the rest of the sub-committees, in terms of raw data presented to our Commission.

We hope to get into that very quickly and we have thought that for the next Commission meeting it would be devoted to that.

So far we have had three or four different suggestions as to what the next Commission meeting should be devoted to.

At any rate, whether it is the next one or not I hope it will be given priority because we do need that.

So we have had several sub-committee meetings. We do not, however, have even tentative recommendations to put before you and hence, will not be exposed targets like the rest of you.

MR. LEVINE: Don't be so sure.

MR. NIMMER: Not to say we haven't in very tentative ways talked about directions that we

might take but nothing more than that.

What we specifically have in mind is: Bob Frase has come up with some names of specific people for testimony. What we want, I think, may be generalized into two areas.

We want technological information about the way photocopying machines work, the way they work now, the way they are likely to work in the future and the economics related to that.

Included in that is an interest in what kind of policing devices are technologically and economically feasible in connection with building into machines so that one can know in simple ways, or maybe not simple ways, whether they are simple is the issue, one can keep track of what kind of photocopying is done and that sort of thing.

Beyond that, beyond the purely technological side, we have names of various individuals, I hope we are going to have more, who have either proposed or in the course of proposing various what may be called clearing house schemes for keeping track as a kind of royalty checking device, a la ASCAP, et cetera, in connection with photocopying.

Then one of the issues that I presume

will be put to the Commission as such is if we do favor some kind of collective action in this area, will we recommend on the one hand the private industry model as ASCAP, as of the Author's Society that exists in European and other countries or, alternatively, will we opt for some sort of official governmental type of central agency.

Related to that but a separate question will be will we feel some sort of compulsory license by law is desirable.

Whether or not it is going to be operated through private agencies or through the Government and beyond that we hope to come up with some imaginative proposals, and we hope that you are going to come up with some imaginative ideas and generally what can be done as photocopying becomes more and more prevalent.

How can we harness it? We are now talking about beyond the area of fair use and beyond the area of 108 for library photocopying.

What can be done in terms of having a simple royalty system that, on the one hand, will be economically feasible for the user, on the other hand will be meaningful for the copyright owner and

how can it be policed?

Well, I guess those are the fundamental issues. We talked about them tentatively in our sub-committee, but we have felt we need more hard data of the type we talked about for testimony before we make that more specific.

I may have left out something that I should say and please join in, committee members, or Bob.

MS. WILCOX: The one thing that is difficult to assess, of course, is what impact this will have on society, on any kind of policing, any kind of controls on the dissemination of knowledge or information.

It is easier to quantify the other things and I think our discussions are even having difficulty focussing on that need, but I think that is probably the most critical thing that we may have to do, because I'm not sure we can address the answers to licensing or regulations until we understand the impact on dissemination.

MR. NIMMER: That is a relevant issue.

MS. WILCOX: Part of that gets back to my frustration with the Commission in not having a

legal mind, and ability to make distinctions or the art of discrimination with regard to the commonalities or the differences per se with a chip and something else or the distinctions between a data base and an Encyclopedia Britanica, if you will, or the distinctions between a set of instructions and hard wiring or the distinctions as C. P. Snow put between the two cultures and the contributions of the two and how they affect our society.

JUDGE FULD: I am sure it will all be solved before the end of '77.

MS. WILCOX: Thank you for the assurance.

MR. LEVINE: May I just make a suggestion as to hearings on photocopying?

I think just for purposes of the record we ought to have the representatives of the Author's League and Publishers come in.

MR. NIMMER: I am awfully sorry, that was our contemplation too.

MR. LEVINE: This is what we want. If no one is urging either different protection or less protection, then there may be very little need for us in this area to do very much.

MR. NIMMER: I'm not sure that that is

true.

MR. LEVINE: Well, my assumption may be wrong.

MR. NIMMER: It is relevant what they think.

MR. PERLE: I am unclear as to why there is the charge of this Commission to make recommendations as to whether or not there should be a clearing house and, if so, what kind of clearing house.

I mean, are we supposed to do that?

MR. HERSEY: Senator McClellan has explicitly asked us to consider it.

JUDGE FULD: I would have thought so too.

MR. PERLE: If this be the case we are going to have to get testimony from the people who have already started on this in various ways.

MR. HERSEY: That is under contemplation.

MR. FRASE: This is prior to the agenda. Starting with the next meeting, I hope.

MR. PERLE: One of the next things that comes up in that regard, and let us stop using the word "photocopying", let us use reprography or --

MR. LEVINE: Xeroxing. (Laughter)

MR. PERLE: If we are to consider clearing houses are we going to restrict the clearing house to reprography or are we also going to consider a clearing house for inputting of literary material into machines and computers? Because we haven't considered this at all, but it may very well be that the same or analogous mechanism can serve for both.

MS. WILCOX: It may be another question that the Commission is to address and that is whether or not it has any role to play in setting up the measurements of the impact of the current legislation or 108(i), the oversight.

DR. DIX: Looking ahead to the five year review?

MS. WILCOX: In order to make any kind of evaluation of the impact, some bench marks, or something has to be established now. You really can't measure that five years from now without maybe looking at it as to how you are going to measure it.

MR. HERSEY: Further, what you are saying, Gabe, we saw yesterday the possibility of a no-man's land developing between sub-committees in the area of reprography done through computers and

copying done through computers. We haven't really got into this at all. We don't know whether you are getting into it or anybody is getting into it.

MR. PERLE: We have to decide as a Commission.

JUDGE FULD: Do you have any idea, Arthur, of what the agenda will consist of?

MR. LEVINE: In January?

JUDGE FULD: Yes.

MR. LEVINE: I think we must spend the January meeting on photocopying.

MR. FRASE: I wonder if we are getting sort of jammed up here, whether the sub-committee could have some hearings.

JUDGE FULD: The sub-committee report --

MR. FRASE: How does that appear to you, Mel?

MR. NIMMER: Only in terms of another meeting it doesn't delight me. If necessary we can do it that way.

JUDGE FULD: You will give a thought early and try to get it.

MR. LEVINE: It may be that we will have to if we are up to it. And I don't want to

characterize it as the type of meeting where we spend some time in the evening meeting in order to get as much accomplished as we can.

MS. WILCOX: Could I suggest there might be something half way inbetween? I mean this meeting was very kind of light in content and time spent, and the other was very heavy. That was obviously overkill but the time is important and I think everybody on the Commission feels the value of time.

MR. LACY: Mr. Chairman, I do feel a pressure. Half our life has now gone by us and we have had approximately half of the total number of meetings which we will probably have, and I think we realize we basically, except for the work in developing guidelines on interlibrary copying and we really just had explored the educational section and only today are beginning even tentatively to the matter of exploring things. And it seems to me that contending with our present pace we simply will not have done what we need to do by the time the Commission life expires.

I think we would be irresponsible to simply ask for another year when we really haven't

done our best to get it done.

I think there are two alternatives. One -- well, there are others, but the two that occur to me which are more practical, we might schedule three day meetings. Most of us can't take another day but we might have to extend the Thursday and Friday sessions to Saturday or because we might do them both, have the sub-committees have formal meetings with hearings and creating a record to accumulate the testimony we need on some of the specific issues that come up in photocopying and data base.

A record being available, of course, to all the members of the Commission and this might expedite matters but I think somewhere along the line it is essential that we adhere to the schedule.

MR. NIMMER: Am I in error that apart from photocopying, reprography and Xeroxing don't we have all the testimony we need? Isn't it just now a matter of hammering out what our positions are?

MR. LACY: I suspect in the computer area that we will find the need when we get to actually drafting more answers on specific points and whether we feel the need is there, I think it is essential for a responsible presentation to Congress that we have

exposed our draft proposals to the test of interested parties who can comment, not just comment about the world of computers but what they think would or would not work or would or would not meet needs or would or would not be unduly repressive in specific legislation, so I am hoping we have post drafts here.

MR. NIMMER: But at the very least the next step in those areas, the computer-related areas, should be our substantive discussions.

MR. LACY: I agree, yes.

What we need now is with regard to this line, more than half of our effective life gone are we going to make it and if we are going to make it at what point are we going back to the Congress and say extend this?

JUDGE FULD: I personally would be opposed to that.

MR. LACY: I think we ought to make it. We took on a responsibility knowing that and I think we ought to discharge it.

JUDGE FULD: The time given to us.

MR. MILLER: But part of our time was deprived us by the late creation of the Commission and further time was taken away from us by the detour

in connection with the final enactment of the statute.

I for one would not feel guilty if we asked for six more months or nine more months, given the evaporation of our time.

MR. LACY: If it proves to be necessary, but --

JUDGE FULD: We would be reluctant.

MR. LEVINE: Let me suggest that if we are going to do this in terms of legislative process it ought to be begun fairly soon.

The Commission was created with an expected life of three years and we will, in effect, have two years and three months.

JUDGE FULD: Nine months would be very natural, it would seem.

MR. PERLE: With the present Congress.

MR. NIMMER: You know, I don't oppose an extension if that proves necessary, particularly with Arthur Miller's point, and maybe just in the interests of safety we should think about legislative process points and we should think about whether we want to start that ball rolling.

But if all we have to do, minimizing it, but if we have no requirements from here on out other

than to hammer out our proposals in the computer-related areas and submit them for reaction to relevant bodies, I am not at all sure that that isn't enough time.

I mean, how long do we need to hammer out proposals?

They are not going to be perfect but they are not going to be perfect if we take ten years or six months. So I don't know if a time measure is all that great.

MR. PERLE: May I suggest that the staff gets up a timetable and a very exhaustive description of each meeting and each step we have to take because that is going to have to happen which Rhoda alluded to and that is very valid. I think the proposals that we end up with have to have not only exposure to the affected industry and some societal groups also, the public sector, and I simply fear that if we are to get all this done within the statutory time period we are going to do a sketchy job.

So if Arthur can come up with a very detailed timetable then we are in a better position to know.

JUDGE FULD: I think an informal

discussion perhaps in any event, preliminary with the Congressional leaders might be helpful.

MR. LEVINE: Fine. I will be happy to get that out well in advance of the next meeting and I will explore with the staff of the sub-committees timetables, should we need to ask for an extension.

There is a double step. First you have to get authorization to extend the life of the Commission and then you have to get an appropriation and then you have to get the appropriations so it is a double legislative step involving both the Senate and the House.

I don't know what the new President's attitudes will be towards that.

MR. PERLE: That is why it is my very strong feeling that if it looks as though and it looks to me as though the timetable is just too tight that we ought to get the insurance now because I think that as a practical matter this Congress, recognizing that we have been deprived of a portion of our effective lifespan, will, without too much trouble, consider extension. I think that it would be very or virtually impossible to educate a new Sentate sub-committee, for example, into what we are, what we are doing and

how we are doing it.

MR. LEVINE: When Judge Fuld and I met originally and Mel Nimmer and I met originally with Congressman Kastenmeier he indicated at that point that he kind of fully expected us to be coming back and asking for an extension.

MR. NIMMER: He would be surprised.

MR. LEVINE: Yes, he said he has never been involved with the Commission that did not ask for the time to be extended.

JUDGE FULD: I think the climate would be such and I think in terms of the report to be circulated for comments that we may need more time.

We may not need nine months though.

MR. PERLE: Well, Arthur, in view of the fact that Congress would expire and in view of the fact that November 19th --

MR. LEVINE: It won't be this Congress that does it.

MR. PERLE: Okay.

MR. LEVINE: They are not going to come back, this Congress.

JUDGE FULD: If there be nothing else to be said we will adjourn.

MR. LEVINE: One more sub-committee.

MR. NIMMER: I had one thing, not on the sub-committee though, but very briefly.

Is there another sub-committee report?

MR. LEVINE: It is the new work sub-committee and it is unclear as to who is to make a report.

MS. KARPATKIN: Dr. Dix is going to make a report.

MR. NIMMER: Am I correct then in concluding that it is the Commission's determination that the Commission will not be going into the specific application of video tape recorders to taking conventional programs off the air?

JUDGE FULD: Unless it changes its mind.

MR. NIMMER: Obviously always, but that is the view of the Commissioners,is that right?

JUDGE FULD: Yes.

Did you want to, Dr. Dix, say something briefly?

DR. DIX: The committee on computer-created works had its first meeting and it had a very brief preliminary paper, staff paper, done by Jeff

which you have all seen, I guess.

I am not the Chairman. And let me state first the Chairwoman was elected by acclamation but had pushed aside the crown successfully so far but we hope it will alight upon her.

I think we felt that since this subject appears in the legislative history there ought to be a Commission comment on it, even if it is only a comment that says it is not a subject of substance so we must say something.

Two, we felt it desirable to explore further what some of the groups who might have a conceivable interest have to say about it.

That is, such things as computer-created music and computer-created art and to see whether the actual practitioners of these arts feel that there is something of substance here that needs protection.

We, I think, got some insights yesterday in the testimony about the idea of computer-created programs and this overlaps into the other field and the question is whether this is part of the charge of this committee or another one and it seems to me not clear.

This is really about all we decided this morning but I think since I hadn't expected to be called on the other two members of the committee ought to add anything they had to say on the subject.

JUDGE FULD: That seems complete. We will hear the rest of it at the next meeting in the reports of the other sub-committees.

With that we will recess to Rosoff's Restaurant. We will adjourn for the day.

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